THE PHONETICS OF COLLOQUIAL TAMIL

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Ph.D University of Edinburgh 1972

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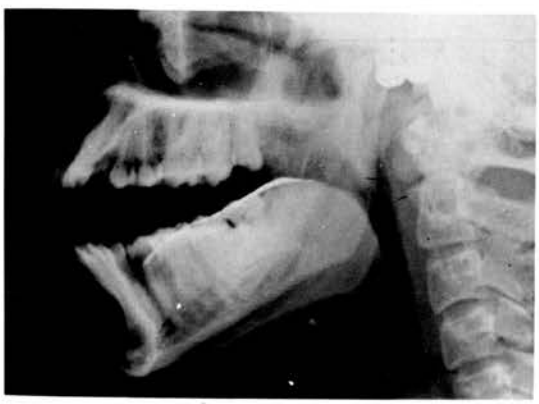

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CONTENTS

Appendices

SUMMARY.

The following pages are a phonetic study of one of the varieties of colloquial Tamil, a language belonging to the Dravidian family of languages spoken in Southern India.

The introductory chapter gives a brief account of Tamil and deals with the several contrasts that one faces while attempting a linguistic analysis of the language. A few illustrative examples are given to elucidate these contrasts.

Chapter II is a short account of the orthography of Tamil. The orthographic symbols representing the vowels and consonants are given. Each orthographic symbol is transliterated with I.P.A. symbols. The non-existence of a one-to-one relationship between the orthographic symbols and the sounds they represent is outlined.

Chapter III is an account of the instrumental techniques employed during the course of the research.

The next chapter is a detailed account of the vowels of colloquial Tamil. Fourteen vowel phones are discussed with palatographic, kymographic, spectrographic, labiographic, cine-photographic and Rõntgenographic evidence. The distributional characteristics of each vowel are discussed with illustrative examples. Vowel length is analysed with kymographic evidence. The

accidental nasalization and the essential nasalization of vowels are discussed. The chapter concludes with an account of the two diphthongs that occur in the colloquial dialect analysed.

Chapters V and VI are a discussion respectively of the "double" voiceless stops of Tamil and aspiration of voiceless stops in Tamil. These two chapters contain a detailed kymographic investigation.

Chapter VII is a palatographic and kymographic study of the consonants of colloquial Tamil. Each consonant is described in terms of its articulation. Where possible, palatograms are reproduced in support of the statements made in articulatory descriptions. The distributional characteristics of the consonants are analysed with illustrative examples.

Chapter VIII is a brief phonemic analysis of the colloquial dialect of Tamil under survey. The next chapter deals with similitude, assimilation, elision and epenthesis. Chapter X is a brief outline of the syllable and its structure in colloquial Tamil.

Chapter XI is a short, preliminary study of two of the suprasegmental aspects of colloquial Tamil - stress and intonation. The former was analysed with the help of the intensity meter and the latter with the sound spectrograph. Some tentative conclusions are drawn on these suprasegmental features.

There are seven appendices following chapter XI.

Appendices Ia and Ib are relevant to Chapter I, Appendix II to Chapter IV, appendices IIIa and IIIb to Chapter V and appendices IVa and IVb to Chapter VI.

ACKNOWLEDGEMENTS

The present writer would like to express his sincere thanks to the following:

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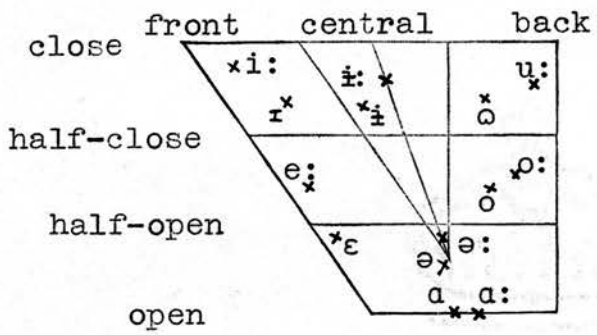
LIST OF SYMBOLS USED

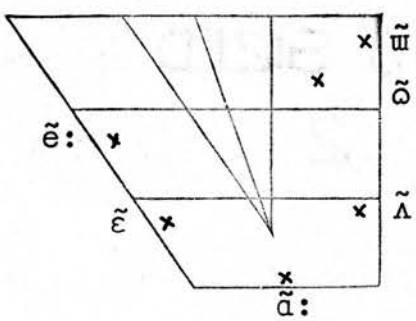
VOWELS:-

I.P.A. symbols have been used throughout. The vowel symbols used do not have cardinal values. The vowel symbols used and their relation to the cardinal vowels are given below.

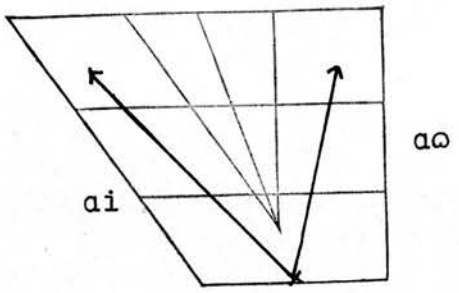
ORAL VOWELS



NASAL VOWELS



DIPHTHONGS



In phonemic transcriptions, the symbols ɪ, ɛ and ʊ have not been used. Instead, i, e and u have been used.

Consonants:-

p, b .. voiceless and voiced bilabial stops.

t̪, d̪ .. voiceless and voiced dental stops.

t̲, d̲ .. voiceless and voiced post-alveolar stops.

ʈ, ɖ .. voiceless and voiced retroflex stops.

k, g .. voiceless and voiced velar stops.

tʃ, dʒ .. voiceless and voiced palato-alveolar affricates.

m .. voiced bilabial nasal.

n̪ .. voiced dental nasal.

n .. voiced alveolar nasal.

n̲ .. voiced post-alveolar nasal.

ɳ .. voiced retroflex nasal.

ɲ .. voiced palatal nasal.

ŋ .. voiced velar nasal.

l .. voiced alveolar lateral approximant.

ɭ .. voiced retroflex lateral approximant.

β .. voiced bilabial fricative.

f .. voiceless labiodental fricative.

ð .. voiced dental fricative.

s .. voiceless alveolar fricative.

ʂ .. voiceless retroflex fricative.

ʐ .. voiced retroflex fricative.

ɕ .. voiceless alveolo-palatal fricative.

j .. voiced palatal fricative.

h .. voiceless glottal fricative.

ɦ .. voiced glottal fricative.

ɾ .. voiced alveolar tap.

ɽ .. voiced retroflex flap

ʋ .. voiced labio dental approximant.

ɻ .. voiced retroflex approximant.

w .. labio-velar semi vowel.

j .. palatal semi vowel.

In addition to the I.P.A. symbols listed above, the following mainly I.P.A. conventions have been used where necessary:

[˜] ... nasalization

/V^N/ ... a nasal vowel phoneme, V being any oral vowel.

[̪] ... dental articulation

[̟] ... post-alveolar articulation

[˕] ... opener variety of vowels

[˔] ... closer variety of vowels

[˖] ... advanced variety of vowels

[˗] ... retracted variety of vowels.

[:] ... fully lengthened segment

[·] ... slightly lengthened segment

['] ... stress (placed at the beginning of a stressed syllable)

[̩] ... syllabic consonant

[ʻ] ... slight aspiration.

The usual conventions of underscoring transliterations, enclosing phonemes within slant lines and phones within square brackets have been followed throughout.

I.P.A. symbols have been used even in transliterations, using one I.P.A. symbol for one Tamil orthographic symbol.

LIST OF ABBREVIATIONS

acc.	...	accusative
ed.	...	edited by
edn.	...	edition
dat.	...	dative
imp.	...	imperative
nom.	...	nominative
n.	...	noun
v.	...	verb
voc.	...	vocative

kgm.	...	kymogram
lgm.	...	labiogram
Mgm.	...	Mingogram
Pgm.	...	Palatogram
Sgm.	...	Spectrogram

C.I.E.	...	The Central Institute of English (Hyderabad, India).
BSOAS	...	Bulletin of the School of Oriental and African Studies.
IRAL	...	International Review of Applied Linguistics.
JASA	...	Journal of the Acoustical Society of America.
TPhS	...	Transactions of the Philological Society
UCLA	...	University of California, Los Angeles.

NOTES TO THE READER

1. All the spectrograms, kymograms, mingograms and most of the palatograms reproduced in this thesis are reduced from the original size.

2. Cross-references are to the relevant chapters, sections and sub-sections. 4.3.2 stands for Chapter IV, section 3 and sub-section 2. 7.4.5.6 stands for Chapter VII, section 4, sub-section 6 of sub-section 5.

Chapter I

Introductory Remarks

(Pages 1 - 42)

Chapter I

1 Introductory Remarks

1.1 Tamil and the Dravidian Family of languages:-

1.1.1 Tamil belongs to the Dravidian Family of languages. All languages belonging to the Dravidian Family are spoken in India. The study of Dravidian linguistics began with the pioneering work of Robert Caldwell.[1] In fact it was he who called the family of languages Dravidian. (It was till then referred to as "Tamulian" or "Dekhan").[2] In his work Caldwell mentions the names of twelve languages belonging to the Dravidian Family - Tamil, Telugu, Malayalam, Kannada, Kota, Tota, Tulu, Gondi, Kui, Kurukh, Malto and Brahui. (Some of these are not Caldwell's spellings.) Of the Dravidian languages, Tamil, Telugu, Malayalam and Kannada are the literary languages and the others, the non-literary languages, are known to scholars interested in Dravidian linguistics. ~~Scholars'~~ Knowledge of

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1. Caldwell, Robert (1961). ? ?

2. See Zvelebil (1970, 12).

these, in the words of Emeneau (1969, 334), "ranges from very good to little more than the name and a word-list".

1.1.2 More languages belonging to the Dravidian family came to light after Caldwell published his Comparative Grammar. Kolami was recognized in 1866; Parji has been mentioned by Grierson in his Linguistic Survey of India - vol. vi (1906); Konda and Gadba came to be known in 1956, Naiki and Pengo in 1957-58, Manda in 1964 and Naiki of Chanda in 1966.[3] Emeneau (1969, 334) has added these later discoveries to his list of Dravidian languages. Emeneau's list includes Tamil, Telugu, Malayalam, Kannada, Toda, Kota, Kodagu, Tulu, Kolami, Naiki of Chanda, Parji, Gadba, Gondi, Konda, Pengo, Manda, Kui, Kuvi, Kurukh, Malto and Brahui. Zvelebil (1970,14) observes: "while Caldwell includes twelve Dravidian languages in his Grammar ... to-day we know at least twenty-two Dravidian languages and ... it is not yet certain whether all of them had actually been discovered".

1.1.3 Of the four literary Dravidian languages Tamil is "the most well-known, enjoys the greatest

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3. For a detailed account of these discoveries, see Zvelebil (1970, 11-15).

geographical extension, has a rich and very ancient literature, paralleled in India only by that of Sanskrit".[4]

1.1.4 Tamil is one of the sixteen languages recognized by the Constitution of India for official purposes. It is the regional language of the southern state of Madras (which was re-named "Tamil Nadu" - literally, "the Tamil country" - a few years ago). Tamil is the medium of instruction in the majority of primary and secondary schools throughout the state of Madras. For the past twelve years or so, Tamil has been the alternative medium of instruction in the Madras and Madurai Universities in South India (it should be mentioned that it is not a popular medium of instruction in Universities).

1.1.5 According to the latest census report available,[5] a total of 30,562,706 people speak Tamil in the whole of India, that is to say 6·95 percent of the total population of India (1961 figures). Of these, 28,016,147 are residents of

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4. Zvelebil (1970,15)

5. Census of India 1961, Vol. I, Part II - c ii- Language Tables, Government of India (1964).

Madras State. There are Tamil-speakers in every State in the Republic of India, but the States in which there are a considerable number of Tamil speakers are the southern States of Andhra Pradesh, Mysore and Kerala, where the regional/state languages are Telugu, Kannada and Malayalam respectively. Apart from these southern states, Maharashtra has 167,694 Tamil speakers and the centrally administered province of Pondicherry 325,862.[6]

1.1.6 Two maps are reproduced on the next two pages. The first is a map of India with state-boundaries marked. The language of each state is marked as also the number of Tamil speakers in each state. The second is an enlarged map of South India, marking the four southern states.

1.1.7 Apart from India, there are Tamil speakers in several parts of the world. Thani Nayagam[7] points out the following geographical distribution and demographic statistics of Tamil speakers:

India:	30,562,706
Ceylon:	2,371,036 (approximate 1953 figure)
Malaya:	634,681 (1957)
Singapore:	23,000 (1947)

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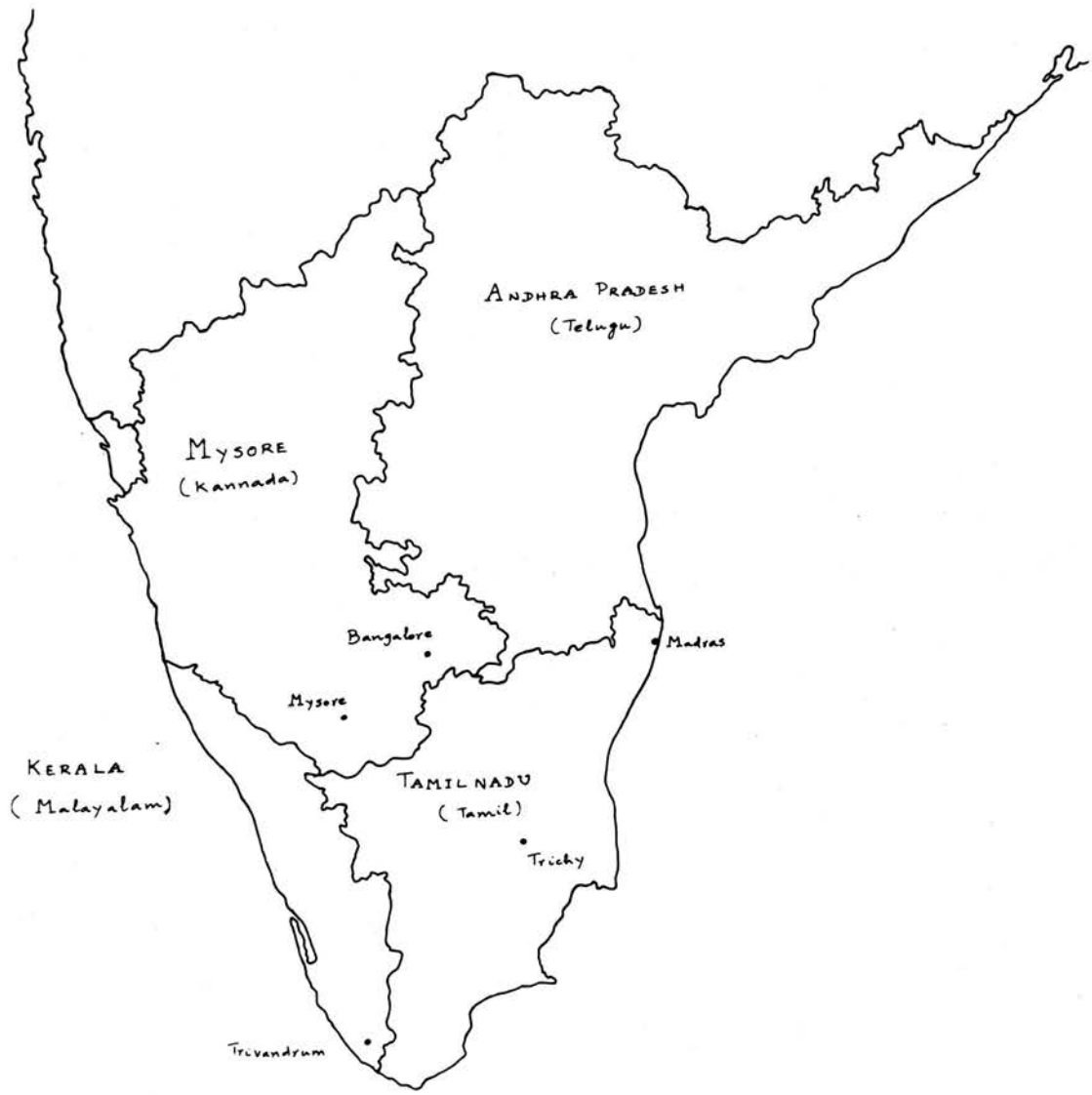
6. Geographically, Pondicherry is inside Tamil Nadu.

7. Thani Nayagam, X.S.(1970) The Study of Tamil Groups: III[e] Conférence Internationale d'études tamoules. Paris, July 1970.


JAMMU & KASHMIR (Kashmiri, Urdu) 549
PUNJAB & HARYANA (Punjabi, Hindi) 6,789
DELHI (Hindi) 22,963
RAJASTHAN (Rajasthani, Hindi) 3,443
UTTAR PRADESH (Hindi) 12,899
NEPAL
BHUTAN
NEFA 389
ASSAM (Assamese) 4,501
NAGA-LAND 86
BIHAR (Bihari, Hindi) 16,177
BANGLA DESH
MANIPUR (Manipuri) 17
TRIPURA 49
GUJARAT (Gujarathi) 13,264
MADHYA PRADESH (Hindi) 28,141
ORISSA (Oriya) 6,918
WEST BENGAL (Bengali) 32,663
MAHARASHTRA (Marathi) 167,694
ANDHRA PRADESH (Telugu) 511,595
GOA, DIU, DAMAN (Portuguese, Konkani) 286
MYSORE (Kannada) 859,173
TAMILNADU (Tamil) 28,016,147
KERALA (Malayalam) 527,708


ANDHRA PRADESH
(Telugu)
MYSORE
(Kannada)
Bangalore
Madras
Mysore
KERALA
(Malayalam)
TAMIL NADU
(Tamil)
Trichy
Trivandrum

Burma: 200,000 (1966)
Fiji: 1,498 households (approximately 25,000 in 1956)
Mauritius: 44,044 (1963)
Martinique: 14,000 (of Tamil descent)

In addition to these, there are unspecified numbers of Tamil speakers in Indonesia, Vietnam, New Caledonia, Tahiti, South Africa, Réunion, Rhodesia, Guadeloupe, Cayenne, Surinam, British Guiana and Trinidad.[8]

1.2 The Dialects:-

1.2.1 Considering that there are a number of places in the world where Tamil is spoken, an interesting question arises : Are there many dialects ? If there are a multiplicity of dialects, is there any one dialect that can be called the standard dialect ? Is there an equivalent of (British) English R.P. in Tamil ?

1.2.2. There are a number of dialects and there is a standard dialect. But a special feature of this standard dialect is that no one uses it for informal, spontaneous speech. No doubt, very few people use R.P. in English, but these few SPEAK it, use it in their day-to-day spontaneous speech. In Tamil, the so-called standard dialect is not used for informal speech at all. This will be discussed in detail later.

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8. See Zvelebil (1970,15-16) for a similar list of places where Tamil is spoken.

1.3 Spoken Tamil - the two major dialects:-

1.3.1 Among the spoken varieties of Tamil[9] one comes across two major types - formal Tamil and colloquial Tamil.

1.3.2 Formal Tamil:- As pointed out earlier (see 1.2.2) no one who is a native speaker of Tamil ever uses formal Tamil for ordinary, day-to-day conversational purposes. It is used by news-readers and programme announcers on the radio, lecturers who give formal lectures, platform orators if their audience is made up of educated people, (some platform orators use the formal variety of Tamil even though a great part of their audience may not understand them fully) actors on the stage who portray sophisticated characters and by people who read something aloud. A few examples of formal Tamil and their colloquial Tamil equivalents are given on the next page to illustrate the difference between the two. The orthographic version is given for each word or phrase. The formal versions are the present writer's

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9. The varieties of Tamil spoken in India alone are taken into account here. There is a lot of difference between say, Indian colloquial Tamil and Ceylon colloquial Tamil. The varieties of Tamil spoken outside India are not considered anywhere in this thesis.

pronunciation if he ever has to use this type of Tamil.[10] The colloquial variety is the one used by the present writer in his spontaneous speech.

Orthographic version	formal Tamil	colloquial Tamil	gloss
panri	[p'andɾɪ]	[p'an:ɪ]	pig
inru	[ɪndɾɨ]	[ɪn:ɪk'ɪ]	to-day
ilai	[ɪlai]	[jɛlɛ]	leaf
vaṉṯu koṇṭu irukkira:n	[ʋaṉdɨßoɳ-ɖɾɨk'ɪɾa:n]	[ʋaṉdɨndɾ-ɨk·d̄:]	(someone) is coming.
ka:jṉṯu po:jirru	[k'a:jṉdɨßo:jɪtɾɨ]	[k'a:ɲdʒɨßo:t·ʃo]	(it) has dried up
nerri	[nɛtɾɪ]	[nɛṯ:ɪ]	forehead
iraṇṭu	[ɪraɳɖɨ]	[rəɳɖɨ]	two

10. It should be mentioned here that any educated Tamilian has at least two varieties of Tamil at his command - the formal variety and his own type of colloquial Tamil. In fact every Tamil speaker learns two varieties of Tamil - the formal variety at school and the colloquial variety at home and from playmates. One also comes across Tamil speakers who can speak different varieties of colloquial Tamil.

1.3.3 Not all the words, in their colloquial pronunciation, are so totally different from the formal pronunciation as the examples might indicate. There are several words which are pronounced alike in formal Tamil and colloquial Tamil. A few examples are listed below:-

Orthographic version	formal Tamil	colloquial Tamil	gloss
maṇi	[maɳɪ]	[maɳɪ]	bell, time
pani	[p'anɪ]	[p'anɪ]	dew
vajal	[ʋajəl]	[ʋajəl]	field
majil	[majɪl]	[majɪl]	pea-cock
mannippu	[man:ɪp'ɨ]	[man:ɪp.ɨ]	forgiveness
puḷi	[p'ʊɭɪ]	[p'ʊɭɪ]	tamarind

1.3.4 The differences between formal Tamil and colloquial Tamil, where such differences exist, can be stated under a number of heads. A few of these are described below:-

1.3.5 A striking difference between formal Tamil and the various colloquial varieties is the

occurrence of nasal vowels [11] in the latter. The nasal vowels occur only in word-final position. These are words in the orthographic representation of which there is a final nasal consonant. The nasal consonant is pronounced in formal Tamil. Where we have a word-final [V + N] [12] in the formal variety, we have only [Ṽ] [13] in most of the colloquial varieties. A few examples are cited below:-

Orthographic version	formal Tamil	colloquial Tamil	gloss
paṇam	[p'aṇəm]	[p'aṇ̃]	money
vanta:n	[ʋanda:n]	[ʋandɑ̃:]	he came
po:ne:n	[p'o:ne:n]	[p'o:nɛ̃]	I went
poruttam	[p'oroṭ'am]	[p'oroṭ·ɤ̃]	suitability

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11. The term "nasal vowels" is used to distinguish between essential nasalization of vowels and accidental nasalization of oral vowels under the influence of adjacent nasal consonants. The latter are referred to as "nasalized vowels". For a detailed discussion of these, see 4·3 and 4·4 in chapter IV.
12. V stands for any vowel and N for any nasal consonant.
13. [Ṽ] stands for a "nasal vowel" - see footnote 11 above.

1.3.6 Another striking feature of many of the colloquial dialects of Tamil is the lack of word-final consonants, particularly [l] and [ɭ] [14] where these consonants are to be found in the corresponding formal items. A few examples are given below:

Orthographic version	formal Tamil	colloquial Tamil	gloss
avaɭ	[avəɭ]	[avə]	she
vanta:l	[vandə:l]	[vandə:]	If (someone) comes

1.3.7 There are examples in which a sequence of three or more phones are elided in the colloquial versions of words. Thus formal Tamil [avərʱəɭ] (they) is [avə:] in the present writer's colloquial speech, formal Tamil [vandə:rʱəɭ] (they came) is [vandə:], formal Tamil [p'o:ʱɪri:rʱəɭ] (you-plural-go) is [p'o:re:ɭ] and formal Tamil [ɪrɨk•ɪre:n] (I am) is [ɪrɨk•ɛ̃] [15]

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14. Not all the words in which there is a final [l] or [ɭ] in the formal version of Tamil are pronounced without the final consonant in colloquial Tamil. A few examples in which the final consonant is pronounced in colloquial Tamil are [k'andal] (rags), [mɪn:al] (lightning), [ʤan:al] (window), [manʤaɭ] (yellow) [k'ɔrɔk•əɭ] (priest). Many more such examples can be quoted. No systematic statement can be made about these and they must therefore be considered just exceptions.

15. All the formal Tamil versions given here are the present writer's pronunciation when he uses this type of Tamil.

1.3.8 Yet another difference between formal Tamil and the colloquial varieties concerns a large set of vocabulary items. In many of the colloquial varieties, in pronouncing monosyllabic words with a final [n], [ɳ], [l], [ɭ] and [r] ~ [ɾ] [16] a vowel may be added to the final consonant. In pronouncing these words with the epenthetic vowel, the final consonant is lengthened if the vowel preceding it is short. The final consonant is pronounced very short if the vowel preceding it is long. In the formal pronunciation of monosyllables ending in [n], [ɳ], [l], [ɭ] and [r] ~[ɾ] there is no such vowel added. A few examples are listed below:

Orthographic version	formal Tamil	colloquial Tamil	gloss
te:n	[t̪ʻe:n]	[t̪ʻe:n] ~ [t̪ʻe:nɨ]	honey
pon	[pʻon]	[pʻon] ~ [pʻon:o]	gold
a:ɳ	[a:ɳ]	[a:ɳ] ~ [a:ɳɨ]	male
kaɳ	[kʻaɳ]	[kʻaɳ] ~ [kʻaɳ:ɨ]	eye
pa:l	[pʻa:l]	[pʻa:l] ~ [pʻa:lɨ]	milk
pal	[pʻal]	[pʻal] ~ [pʻal:ɨ]	tooth
te:ɭ	[t̪ʻe:ɭ]	[t̪ʻe:ɭ] ~ [t̪ʻe:ɭɨ]	scorpion

16. [r] and [ɾ] are free variants in word-final position. See 7.9.1.1 to 7.9.2.13.

Orthographic version	formal Tamil	colloquial Tamil	gloss
kaɭ	[kʻaɭ]	[kʻaɭ] ~ [kʻaɭ:ɨ]	toddy
mo:r	[mo:r] ~ [mo:r]	[mo:r] ~ [mo:r] ~ [mo:rɑ]	buttermilk
pa:r	[pʻa:r] ~ [pʻa:r]	[pʻa:r] ~ [pʻa:rɨ]	see - imp.

1.3.9 Again, there are differences in the lexical items used in formal Tamil and the different colloquial varieties. There are certain lexical items used only in formal Tamil. For example, [ma:lai] is a term used to mean "evening" in formal Tamil. This word is hardly ever used in the colloquial varieties of Tamil. [sa:ŋgja:lɤ], [sa:jəŋga:lɤ], [sa:jərəʈʂɛ] and [sa:jərəʈ:ʃɛ] are the words used to refer to "evening" in the different colloquial varieties of Tamil that the present writer has knowledge of. Another word that is used in formal Tamil is [ʋa:nolɪ], meaning "radio" or "broadcast". The present writer has never heard this word being used in colloquial speech. [re:ɽɪjo:] is the word most commonly heard, though the expression [pʻe:sərə pʻɛʈ:ɪ] (the talking box) is heard in the speech of uneducated people. [ʈʻɑnbəm] is the word used in formal Tamil to mean "difficulty", whereas in the colloquial varieties [kʻɑʂʈɤ], [kʻɑsʈɤ] and [sɑŋgəɽɤ] are the words most commonly used to refer

to "difficulty". [kʻɑl:u:ɾɪ] is yet another word used only in formal Tamil (college). [kʻɑ:le:ʤ], [kʻɑ:le:ʤ ɨ], [kʻɑ:le:s] and [kʻɑ:le:sɨ] are some of the pronunciations of the English word "college" heard in colloquial Tamil.

1.3.10 It should be mentioned here that in spite of the differences between the formal variety of Tamil and the various colloquial varieties, every educated Tamil speaker, whatever be the colloquial variety of Tamil he uses for spontaneous speech, understands the formal variety and uses it when necessary. Uneducated people will find it very difficult to use formal Tamil - they never get a chance to use it anyway - and may not even follow formal Tamil.

1.4 COLLOQUIAL TAMIL:-

1.4.1 It is all too easy to talk about colloquial Tamil but there is no dialect of spoken Tamil that can be called the colloquial variety of Tamil. There are several varieties of colloquial Tamil which can be broadly divided into (a) communal dialects and (b) regional dialects.

1.4.2 There are two major communal dialects - the varieties of Tamil spoken by people belonging to different communities - of Tamil. There are two major communities in South India - the

brahmins and the non-brahmins - and members of these two communities speak two different varieties of Tamil.

1.4.3 The first major difference between brahmin Tamil and non-brahmin Tamil lies in the lexical items used by speakers of these two different varieties of Tamil. The brahmins very freely use in their Tamil speech words of Sanskrit origin - this is attributed by Fowler (1954, 360) to their "upbringing and heritage". Thus they use [ʤ ɑlx] or [t̪ʻu:t̪ʻx] (the latter is a corruption of the Sanskrit word ti:rtham) for "water", whereas their non-brahmin compatriots would use [t̪ʻɑɳ:ɪ]. The brahmins use [ɖɛjʋx] for "God", whereas the non-brahmins would use the word [kʻɑɽəʋoɭ]. This does not mean that the speech of the non-brahmins is totally free from words of Sanskrit origin. They do use words like [pʻu:ʤɛ] (worship), [moɲx] ~ [moɲx] (face), [nɑʂʈx] (loss), etc., which are all of Sanskrit origin. What is implied here is that one hears more such words in the speech of a brahmin than in that of a non-brahmin. This tendency to use Sanskrit words (though very commonly used native Tamil equivalents exist) finds expression even in the writings of some brahmin writers. One only has to go through a few pages of an author like C.Rajagopalachari (Rajaji) to realize this.

1.4.4 Apart from these purely lexical differences, there are major differences in the pronunciation of words between the brahmins and the non-brahmins. A few examples are given below. The brahmin versions are the present writer's, while the non-brahmin versions are those of a friend's.[17] This friend and the present writer were in Wales during 1969-70 and a few utterances of this friend were transcribed then by the present writer.

Orthographic version	brahmin Tamil	non-brahmin Tamil	gloss
nanra:ka	[nan:a:]	[nal:a:]	good, nice.
ninru koṇṭu irukkira:n	[nin:iṉdɾik•ã:]	[nin:ik•i - ṭɾikɾã:]	he is standing
koṇṭu varukire:n	[k'oṉdɾɛ̃]	[k'oṇḍiṭ•i va:ɾɛ̃]	I will bring (something)
irukkiraṯu	[ɪɾik•i]	[ɪɾik•iðɨ]	It is
avarkaḷ	[ava:]	[avəŋgə]	they
varukira:rkaḷ	[vaɾa:]	[vaɾa:ŋgə]	They're coming
peṭṭi	[p'oṭ:ɪ]	[p'ɛṭ:ɪ]	box
iruṉṯaṯu	[ɪɾiṉdiðɨ]	[ɪɾiṉditʃɪ]	It was

1.4.5 It should be mentioned here that there are several words which are pronounced alike by brahmins and non-brahmins. A few of them are [p'a:k•i] (arecanut), [jɛlɛ] (leaf), [p'ai] (bag), [k'aðəvɨ] (door), [ʤa:ɽɪ] (jar), [ʤan:al]

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17. Mr. D.S. Gururaj, Regional Institute of English, Bangalore, S. India.

(window), [me:ʁɐ̃] (clouds), [p'a:l] ~[p'a:li] (milk), [p'e:na:] (pen), [mu:ɽɪ] (lid). It should be pointed out that the speech of the brahmins and that of the non-brahmins are mutually intelligible.

1.4.6 It should not be imagined that all the brahmins speak the same variety of Tamil. There are two major sub-divisions of the brahmin community - Iyers (worshippers of Siva) and Iyengars (worshippers of Vishnu) - and there is some difference between the Tamil spoken by members of these sub-divisions. The main difference between Iyer Tamil and Iyengar Tamil, however, is lexical. Iyengar brahmins use a few lexical items that are used only by them. A few of these and their Iyer Tamil and non-brahmin Tamil equivalents are given on the next page. The Iyer brahmin variety is the present writer's speech and the other two varieties are also the present writer's pronunciation.[18]

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18. The present writer does not speak Iyengar Tamil, nor non-brahmin Tamil. The transcriptions given, therefore, may not be entirely accurate. But he has lived among Iyengar brahmins and non-brahmins for a number of years and is thus aware of their pronunciation. Therefore the present writer's pronunciation can be accepted as a very close approximation of that of an Iyengar brahmin and a non-brahmin.

Iyengar brahmin Tamil	Iyer brahmin Tamil	non-brahmin Tamil	gloss
[ɸa:ʈ̪ʰamiðɨ]	[rasʌ̃]	[rasʌ̃]	pepper-water
[ʈ̪ʲɪɾɨkʰaɳʰamiðɨ]	[pʰa:jəsʌ̃]	[pʰa:ja:sʌ̃]	pudding
[sa:ðɪtʰ͡ʃɛ̃]	[pʰaɾəma:ɾɪnɛ̃]	[pʰaɾɪma:ɾɪnɛ̃]	I served (food)
[ɖaɭɪɲɛ]	[ɸaməjal]	[saməjal]	menu
[pʰɛɾɨma:ɭ]	[sa:mɪ]	[kʰaɽəʋaɭ]	God

1.5 Regional dialects:-

1.5.1 There are also regional dialects of Tamil. To cite a few, there is Madras Tamil, Madurai Tamil, Erode Tamil, Tinnevelly Tamil, Palghat Tamil and so on.[19] In other words, people living in different districts/regions of Tamilnad speak different varieties of Tamil. These differences may be lexical and/or differences in pronunciation.

1.5.2 The brahmins speak their variety of brahmin Tamil, uncoloured by regional variations, wherever they are. A brahmin who is a native of say, Madras, may work in Tinnevelly and may pick up some peculiarities of Tinnevelly Tamil. But since he speaks his variety of brahmin Tamil to his friends and relatives when he is off work, the brahmin Tamil that he learned in infancy does not leave him. Thus there is hardly any difference between the Tamil spoken by an Iyer brahmin in Madras and that

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19. Some of these have been analysed by Zvelebil. See Zvelebil (1959a, 1959b, 1960a and 1960b).

spoken by another Iyer brahmin in Kanyakumari (the southern tip of India). Among non-brahmins, regional dialect differences are much more pronounced.

1.5.3 In addition to these major dialects of Tamil, there are several so-called "sub-standard" varieties of colloquial Tamil, spoken by the uneducated masses. Zvelebil's (1963, 225) words are significant in this connection: "It is necessary to distinguish carefully among at least three levels of contemporary Tamil language : the standard literary Tamil, the platform speech and the language of literature; ... the standard colloquial (the type of speech used in ordinary informal conversation by educated native Tamilians throughout Tamilnad when talking to the educated members of their family and friends and generally to persons of the same social standing and the same level of education) and the sub-standard Tamil which term covers the local and regional dialects of the folk speech."

1.5.4 To illustrate the difference between formal Tamil and two of the colloquial varieties - brahmin Tamil and non-brahmin Tamil - in a piece of connected prose, "The North Wind and the Sun" [20] is

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20. The story is in The Principles of the International Phonetic Association (1967 reprint, 39). The story, as it is found in the Principles of the IPA, contains a few grammatical mistakes. A few changes have therefore been made in the present transcriptions. Certain words have been omitted and certain others changed.

transcribed on the next page, first in formal Tamil and then in the two colloquial varieties. The formal version and the brahmin Tamil version are the present writer's pronunciation. The non-brahmin version is that of a friend and colleague of the present writer.[21] This friend is in India and he sent his version of the story in orthography. It has been transcribed by the present writer on the basis of the orthographic version. The transcription, therefore, cannot be considered entirely accurate. However, it can be taken that it gives a very close approximation to the forms that occur. In the transcriptions on the next page, sentence-boundaries have been marked by an oblique line.

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21. The present writer thanks his friend S. Albert, M.Sc., Bangalore, India.

1.5.5 FORMAL TAMIL VERSION

[kʻaːt̪ɾɨm suːɾɪjənɨm]

[woɾoɱaːlaɻʻɪl kʻaːt̪ɾɨm suːɾɪjənɨm
jaːɾðaːn pʻɛɾɪjavən jɛn̪dɾɨβaːɾpʻoːm jɛn̪dɾɨ
vaːðaːɽɪkʻoɳɖɪɾɨɳɖanə/ kʻaːt̪ɾɨ naːɳɖaːn
pʻɛɾɪjavən jɛn̪dɾəðɨ/ suːɾɪjən naːɳɖaːn
pʻɛɾɪjavən jɛn̪dɾəðɨ/ aɳɖə samәjәɻʻɪl
avːɪɽəm vaɻɪpʻoːkʻən woɾovən ɕɛn̪dɾaːn/
apʻoːðo naməðɨ vaɻəkʻaiɻʻiːɾkʻə ɪðɨveː
samәjәmɛn̪dɾɨ jaːɾðaːn aɳɖə vaɻɪpʻoːkʻən
meːl ɕot̪ɾɪ ɪɾɨɳɖə poːɾvәjai
ɻʻuːkʻɪviɽɨɱɪɾaːɾɱəɭoː avәɾðaːn pʻɛɾɪjavən
jɛn̪dɾɨ ɪɾɨvәɾɨm samːәðɪɻʻaːɾɱəɭ/ apʻәɽɪjeː
kʻaːt̪ɾɨ balәmaːɱə aɽɪkʻə aːɾәmbɪɻʻәðɨ /
kaːt̪ɾɨ balәmaːɱə aɽɪpʻәðaipʻaːɾɻʻɨ
vaɻɪpʻoːkʻən pʻoːɾvәjai ɪɾɨkʻәmaːɱət͡ʃot̪ɾɪkʻoɳɖaːn/
pʻɪɾəɱɨ suːɾɪjən pɾəɱaːɕɪkʻə aːɾәmbɪɻʻәðɨ/
vaɾə vaɾə vɛjːɪl aðɪɱaɾɪkʻәveː oɽәmbɪl
ɕuːɽo jeːɾɪt̪ɾɨ/ vaɻɪpʻoːkʻən pʻoːɾvәjai
kʻaɻәt̪ɾə aːɾәmbɪɻʻaːn/ ɪðaikʻaɳɖәðɨm
kʻaːt̪ɾɨ suːɾɪjәɳɖaːn pʻɛɾɪjavən jɛn̪dɾɨ
wopʻokʻoɳɖәðɨ]

1.5.6 BRAHMIN COLLOQUIAL

[kʻaːʈ·ɯ̃ suːɾɪjəmɯ̃]

[woɾoɲaːləʈ·ɨlɛ kʻaːʈ·ɯ̃ suːɾɪjəmɯ̃ jaːɾðɑ̃ːpʻɛɾɪjaʋənːɨβaːpːəmnɨ ɕaɳɖɛβoːʈ·ɨndɾɨɳɖɨðɨ [22] / kʻaːʈ·ɨ naːɳɖaːmbɛɾɪjaʋənːɨðɨ/ suːɾɪjɤ̃ naːɳɖaːmbɛɾɪjaʋənːɨðɨ/ apːə aŋgɛ ʋazɻɪpːoːkːɤ̃ woʈːɤ̃ ʋaɳɖɑ̃ːɖ [23] / apːə namːə ʋazəkːɛʈ·ːiːɾkʻə ɪðɑ̃ː samədʒəmnɨ jaːɾɨ aɳɖə ʋazɻɪpːoːkːɤ̃ meːlɛ ɕoʈːiːɾɳɖə pʻoːɾʋəjɛ ʈʻuːkːiːɖɾaːɭoː aʋəɾðɑ̃ː pʻɛɾɪjaʋənːɨ rənɖɨβeːɾɯ̃ [24] samːəðɪʈ·ʃaː/ kʻaːʈ·ɨ balәma aɻɪkːə aːɾəmbɪʈ·ʃɨðɨ/ kʻaːʈ·ɨ balәma aɻɪkːəɾðɛpːaːʈ·ɨ ʋazɻɪpːoːkːɤ̃ pʻoːɾʋəjɛ ɨɾɨkːɪ ɕoʈ·ɪɳɖɑ̃ː/ apɾɤ̃ [25] suɾɪjɤ̃ pɾəɲaːɕɪkːə aːɾəmbɪʈ·ʃɨðɨ/ ʋaɾə ʋaɾə ʋɛjːal

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22. [ʋaːðaːɻɪkːoɳɖɪɾɨɳɖanə] is the formal version. [ʋaːðaːɻɪndɾɨɳɖɨðɨ] is possible in the colloquial version, but [ɕaɳɖɛβoːʈ·ɨndɾɨɳɖɨðɨ] is more common. [ʋaːðɨ + aːɻɨ] and [ɕaɳɖɛ + pʻoːɻo] both mean "to fight, to quarrel"
23. [ɕɛndɾaːn] is the expression found in the IPA Principles, which means "went". This is a literary word, never heard in colloquial speech. [ʋaɳɖɑ̃ː] is the word used in colloquial speech to mean "came along".
24. [ɪɾɨʋəɾɨm] (both of them) is a highly literary word. [rənɖɨβeːɾɯ̃] is the colloquial equivalent heard in many colloquial dialects of Tamil.
25. [pʻɪɾəɲɨ] (then, later) is yet another word hardly heard in colloquial speech. [apɾɤ̃] is the colloquial equivalent commonly heard.

ʤa:sʈɪja:ɦəve: [26] woɽəmbɨlɛ ɕu:ɽo jeːɾɪʈ'ɨ/
ʋazɻp'o:k'ɐ̃ p'o:ɾʋəjɛ k'ajəʈ'ə a:ɾəmbɪt͡ʃ'ɑ̃:/
ɪðɛp'a:ʈ'ɨ k'a:ʈ'ɨ su:ɾɪjəɳɖa:mbɛɾɪjaʋən:ɨ [27]
ɷp'ɨʈ'ɨɳɖɨðɨ]

1.5.7 NON-BRAHMIN COLLOQUIAL

[k'a:ʈ'ɑ̃ su:ɾ jɛnɑ̃]

[woɾoɦa:ləʈ'ɨlɛ k'a:ʈ'ɑ̃ su:ɾɪjɛnɑ̃ ja:ɾðɑ̃:
p'ɛɾɪjaʋɛn:i p'a:ɾk'əla:n:i saɳɖɛ
p'o:ʈ'ɨʈɾɨɳɖ t'͡ʃɪ/ k'a:ʈ'ɨ na:ɳɖɑ̃:
p'ɛɾɪjaʋɛn:ɪt'͡ʃɪ/ su:ɾɪjɛ̃ na:ɳɖɑ̃:
p'ɛɾɪjaʋɛn:ɪt'͡ʃɪ/ ap:o: aŋgɛ ʋaɻɪp'o:k'ɐ̃ [28]

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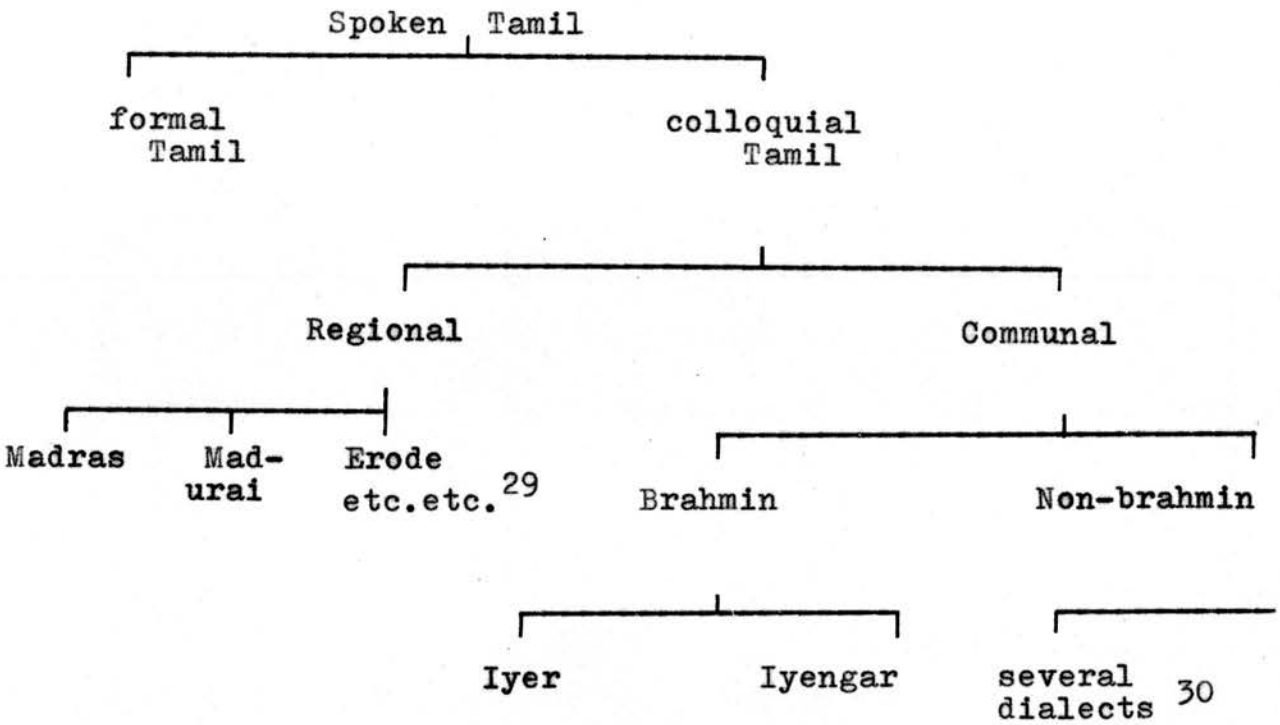
26. [aðɪɦaɾɪk'əve:] (since it increased) is an expression used only in formal Tamil. The colloquial equivalent is [ʤa:sʈɪja:ɦəve:].

27. This expression is made up of four words - [su:ɾɪjən] (sun) [ʈ'a:n] (itself), [p'ɛɾɪjaʋən] (big, strong) and [jɛndɾɨ] (that). In formal Tamil these words are pronounced [su:ɾɪjəɳɖa:n p'ɛɾɪjaʋən jɛndɾɨ]. In the present writer's colloquial speech, these four words are pronounced as one phonological word as transcribed above.

28. Compare the [ɻ] in this word with the [ɻ] in the formal and colloquial brahmin Tamil versions of the same word. Not all non-brahmins use [ɻ] where the brahmins use [ɻ]. Pandits use [ɻ] and this friend seems to use [ɻ] as his transliteration suggested. The orthography represents this sound by a symbol which, in isolation, is read as [ɻ]. Some people use [ɻ] instead of [ɻ] in their formal speech (if they ever use formal Tamil) and in their colloquial speech. There are minimal pairs contrasting [ɻ] and [ɻ] in Tamil and the orthography has two separate symbols to represent these sounds. People who do not use [ɻ] in their speech do not differentiate between words like [t̪'aɻɛ] (leaf) and [t̪'aɻɛ] (bondage).

wo̪ː ʋan̪d̪ː/ apːoː namːə ʋaɭəkʲɛ
t̪ʲiːt̪ʲɨkʲɨɽə ɪðɨðd̪ː samejənːɨ jaːɾɨ
an̪d̪ɛ ʋaɭɪpʲoːkʲɐ̃ meːlɛ so̪ːɪ ɪɾɨn̪d̪ə
pʲoːɾʋejɛ t̪ʲuːkʲɪd̪ɾaːŋgəɭoː avɛŋgəðd̪ː
pʲɛɾɪjavɛnːɨ rɛɳɖɨβeːɾm̃ samːəðɪt̪ʲʃaːŋgə/
kʲaːt̪ʲɨ bɛləmːaː aɽɪkʲə aːɾəmbɪt̪ʲʃɪt̪ʲʃɪ/
kʲaːt̪ʲɨ bɛləmaː aɽɪkʲəɾðɛpˑaːt̪ʲɨ
ʋaɭɪpʲoːkʲɐ̃ pʲoːɾʋejɛ naɭːaː ɪɾɨkʲi
so̪tʲɪkʲɪt̪ʲd̪ː/ apɾəmaː suːɾɪjɛ̃ pɾəɲaːsɪkʲə
aːɾəmbɪt̪ʲʃɪt̪ʲʃɪ/ ʋaɾəʋaɾə ʋɛjːɪl
ʤaːst̪ɪjaːɦəveː ʋaɭɪpʲoːkʲɐ̃ pʲoːɾʋɛjɛ
kʲaɭət̪ʲə aːɾəmbɪt̪ʲʃd̪ː/ ɪðɛpʲaːt̪ʲɨ kʲaːt̪ʲɨ
suːɾɪjɛn̪d̪ɐ̃ː pʲɛɾɪjavɛnːɨ wo̪t̪ʲɨkʲɨt̪ʲɨðɨ]

1.5.8 The following, then, is a diagrammatic representation of the various contrasts one comes across while attempting a linguistic analysis of Tamil :



1.5.9 Of these multiplicity of dialects of Tamil the one analysed in the following pages is the non-literary, colloquial, brahmin (Iyer) Tamil of which the present writer is a native speaker. The idiolect examined is the present writer's own and, occasionally, that of his wife who is a bilingual, speaking Kannada and Tamil with equal fluency.

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29. See Zvelebil (1959a, 1959b, 1960a, and 1960b).

30. There are several dialect varieties in the speech of people belonging to the various non-brahmin communities. See, for example, Zvelebil(1966).

1.5.10 Though it is one type of Tamil that is examined for purposes of this research, it must be pointed out that the vowel quality and the place of articulation of consonants are the same whether the present writer uses his colloquial variety or the formal type of Tamil. So most of the statements made in this thesis on vowel quality, place of articulation of consonants, assimilation, similitude, etc., are true of the formal type of Tamil as well, as far as the present writer's pronunciation is concerned.

1.6 "Pure" Tamil or "mixed" Tamil ?

1.6.1 By "pure" Tamil is meant native Tamil, i.e., Tamil with words of Dravidian origin alone. "Mixed" Tamil refers to the type of Tamil in which native Dravidian words and loan words from many languages - notably from Sanskrit, English and a number of other Indo Aryan languages spoken in India - occur together.

1.6.2 After choosing the dialect he is going to analyse, a linguist is confronted with another problem if the language he has selected for analysis is Tamil. In the dialect he has chosen to analyse, has he to take into account for purposes of his analysis Dravidian words alone, or should he include the numerous loan words that

occur in people's speech ?

1.6.3 A linguist here has three options. He can (a) deal with Dravidian words alone, ignoring loan words; (b) relegate loan words to secondary status; (c) deal with native words on the same footing as loan words. Or, as Firth (1948a) has suggested, he can have different phonological systems - one for native Dravidian Tamil and another for "mixed" Tamil. As Firth puts it : "I pointed out my own findings in Tamil and Telugu, for both of which languages it is necessary to assume at least three phonological systems : non-brahman Dravidian, Sanskrito-Dravidian and Sanskritic..." [31]

1.6.4 We often come across in linguistic analyses of Tamil the statement that there are no initial voiced stops in the language and that [l] and [r] can never begin a word. This statement is true as far as native Dravidian words are concerned. Possibly there was a time in the history of Tamil when only voiceless stops occurred in word-initial position and when [l] and [r] never occurred initially in a word. This certainly seems to have been the case when the orthography of Tamil

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31. Firth, J.R. (1948a, 127 f.n.1)

was devised, for in the Tamil orthography there is one symbol for each set of voiceless stop, the corresponding voiced stop and voiced fricative. For example, whether the orthographic symbol p was [p], [b] or [β] depended upon what phonetic environment it occurred. Even now it is the case with native Dravidian words. But no language can be so static as to preserve its phonological status of say, a millennium ago or more. Tamil speakers, through the ages, have come into contact with the Aryans and their Sanskrit, the Moghuls and their Persian/Urdu, the Portuguese and their Portuguese and the British and their English. Apart from these, the Dravidians came into contact with people of other regions of India where several Indo-Aryan languages are spoken. It is but natural that these languages influenced the phonology of Tamil. New words, willy nilly, crept into the vocabulary of Tamil.

1.6.5 Sanskrit words crept into the vocabulary of Tamil as early as the date of composition of the most ancient grammatical treatise of Tamil, the "Tolkaappiyam" [32]. Hundreds of Sanskrit loan words in the Tamil of the "Tolkaappiyam" have been

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32. literally "the ancient treatise". This is the most ancient work available on Tamil Grammar (composed round about the beginning of the Christian era).

listed by David (1952, chapter 8). Some of these are [ɖɛjʋam] (God), [ɖɪɣai] (direction), [gonəm] (character) [33] and these words have word-initial voiced stops as pronounced by a vast majority of Tamil-speakers to-day. [34]

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33. These are the formal Tamil pronunciations of the present writer. In his colloquial speech these words are pronounced [ɖɛjʋɤ̆], [ɖɛɣɛ] and [gonɤ̆] respectively.

34. These words might have been pronounced with an initial voiceless stop in the days when the "Tolkaappiyam" was composed. One cannot say this with certainty because in this work the word ezuttu (literally "a character, a letter of the alphabet") has been used to refer to letters of the alphabet as well as to speech sounds. The chapter on phonology bears the caption ezuttatikaːram which, translated literally, means "the chapter on the letters of the alphabet". The articulation of sounds is referred to as ezuttukkaḷin pirappu which means literally "the birth of the letters (of the alphabet)". But what is discussed in this chapter is clearly the articulation of speech sounds. There is no evidence that the phenomenon of voicing is referred to in the "Tolkaappiyam". Radhakrishnan (1966, 209-10) says that in the "Tolkaappiyam" the term [ɪɣai] is used for "voicing". Govindan Kutty (1969) refutes this. With such disagreement among scholars, one cannot know precisely how what are now pronounced as voiced stops were pronounced in the "Tolkaappiyam" period.

1.6.6 Several other examples come to one's mind in which there are initial voiced stops and initial voiced palato-alveolar affricate in modern Tamil. Some of these are:

[balɤ]	(strength)
[ba:ɾɤ]	(weight)
[baj^{ɪ}lʋa:n]	(champion)
[bi:ɾo:]	(wardrobe)
[bom:ɛ]	(toy)
[bajɤ]	(fear)
[d̪e:ɸɤ]	(country)
[d̪ɛnɤ]	(daily)
[d̪a:nɤ]	(charity)
[d̪an^{ɪ}ja:]	(coriander seeds)
[d̪aiɾjɤ]	(courage)
[ɖab:a:]	(a tin, a can)
[ɖambɤ]	(pride)
[ganɤ]	(weight)
[go:n̪d̪o]	(glue)
[gaɾʋɤ]	(pride)
[go:l^{ɪ}]	(marbles - children's game; goalkeeper)
[ʤa:ɽ^{ɪ}]	(jar)
[ʤan:al]	(window)
[ʤ^{ɪ}l:a:]	(district)
[ʤami:n̪d̪a:ɾ]	(landlord)

1.6.7 In fact [p] and [b], [t̪] and [d̪], and [k] and [g] contrast with each other in minimal and near-minimal pairs in Tamil as it is spoken today by millions of native speakers throughout Tamilnad. For example, one comes across [p'aɪ̃] (a tiny weight) and [baɪ̃] (strength) contrasting [p] and [b] ; [t̪'anɪja:] (alone) and [d̪anɪja:] (coriander seeds) contrasting [t̪] and [d̪]; and [k'an:ɪ̃] (cheek) and [ganɪ̃] (weight) contrasting [k] and [g].

1.6.8 Again, there are innumerable words beginning with [l] and [r] [35] in modern Tamil. A few of these are:

[lakʂɪ̃]	(a hundred thousand)
[laɲdʒɪ̃]	(bribery)
[la:ɽɪ̃]	(horseshoe)
[lamba:ɽᶦ]	(a gypsy tribe)
[la:n̪d̪al]	(lantern)
[la:jək'ɨ]	(fitness)
[lakʂəɳɪ̃]	(beauty)
[la:βɪ̃]	(profit)
[ra:dʒa:]	(king)
[ra:ɳᶦ]	(queen)
[ro:dʒa:]	(rose)
[ra:t̪ɾᶦ]	(night)

35. [r] in word-initial position is [ɾ] in the speech of some.

[raʋɪk·ɛ]	(a female garment)
[ru:βa:] ~ [ru:ʋa:]	(rupee - Indian currency)
[rambx̃]	(saw - n.)
[rombe]	(too much)
[rajɪl]	(train) [36]

1.6.9 That these and more such "impermissible" sounds occur in the colloquial speech of many a Tamil speaker is illustrated by the results of two minor surveys the present writer conducted during the course of the present research. A tape-recorder was switched on by the present writer or his wife (one did it without the knowledge of the other) and several of their casual conversations and individual utterances were taped. This was done during the course of a month. Some of these were copied onto another tape. These are given in Appendix Ia.

1.6.10 Of the 120 words in the utterances included in Appendix Ia 41 are non-Dravidian words (English: 18; Sanskrit: 20 and Urdu: 3.) [37] In this sample which, though small, can be taken as fairly representative, we see that 34% of the words

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36. Apart from these, there are many proper names beginning with voiced stops, [l] and [r].

37. Each word in these and in the utterances forming Appendix Ib has been checked with the Tamil lexicon, University of Madras.

used by the present writer and his wife in spontaneous speech are loan words and these words have become part of their active vocabulary. Many of these words have word-initial voiced stops, word-initial [ʤ], [l] and [r] - sounds that did not occur in word-initial position in ancient Tamil.

1.6.11 It may be argued that the large number of English loan words in the speech of the present writer and that of his wife is because of their knowledge of English and because of their "English education". To disprove this claim a survey was conducted in India by a friend and colleague of the present writer.[38] This friend visited various places in Bangalore, India, in the course of a few days in November-December 1970 and noted down the utterances of people without their knowledge. The people chosen were mostly the working class - waiters in canteens, attendants in colleges, garage workers and so on. In short, these were people who received no "English education" and who had never gone out of India. These utterances are recorded in Appendix Ib.[39]

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38. The present writer is indebted to Mr. S. Albert, M.Sc.

39. The utterances were recorded by the friend in orthography. They were transcribed by the present writer in I.P.A. The transcriptions are thus not an actual and accurate record of the pronunciation of the various speakers. They are, however, in no sense misleading with regard to the point under discussion here.

1.6.12 Out of the 105 words forming Appendix Ib, 48 are loan words (English: 42; Sanskrit: 3; Urdu: 1 and Telugu: 1). In other words, in this particular sample, 45% of the words used by these unsophisticated people in spontaneous speech are loan words - words with phonological phenomena impermissible in ancient Tamil.

1.6.13 Non-Dravidian words are not confined to spoken Tamil alone. We come across many such words in literature.[40] Vaidyanathan (1959, 96-98) has given a list of 76 Sanskrit loanwords compiled from "popular Tamil weeklies".

1.6.14 Present day writers use loan words very freely in their writing. For example, there are 344 words in a short-story written by a twentieth century Tamil writer.[41] Sixty five out of these are loan words which, taking into account their modern pronunciation, do not fit into the phonological system of ancient Tamil. [42]

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40. "Literature" is used here to mean "written works" which include popular fiction, journalism, etc.

41. The writer is Puthumaippittan. The story is entitled Tirantha Jannal (The open window). See A Tamil Prose Reader, ed. R.E.Asher and R.Radhakrishnan, Cambridge University Press, 1971, 30-36.

42. Of these 65 words 12 are English, 46 Sanskrit, 1 Telugu, 3 Urdu and 3 Portuguese.

1.6.15 To cite another example, Pope's A Handbook of the ordinary Dialect of the Tamil Language [43] is a Tamil-English, English-Tamil dictionary. At the outset, Pope says: "Nearly all the words in this list are in ordinary use; high Tamil words have, for the most part, been excluded".[44] Pope lists 477 words beginning with the orthographic symbol a and 792 words beginning with the orthographic symbol k. Out of a total of 1269 words, 337 are non-Tamil, [45] many of which, in their present-day pronunciation, do not fit into ancient Tamil phonology. In other words, 26·5% of the words in these two lists are non-Tamil words and these words, to quote Pope, "are in ordinary use".

1.6.16 To prove that such extensive use of loan words in Tamil speech and writing is not a modern development, one has to go to "Nannuul", the 10th century Grammar of Tamil. [46] The author of this work has recognised the Sanskrit

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43. Pope, G.U. (1905)
44. Pope, G.U. (1905, 1)
45. Pope himself has given the etymology of non-Tamil words.
46. We have already stated (see 1.6.5) that "Tolkaappiyam", a much earlier work (c. I century A.D), has several sanskrit loan words.

loan words in the Tamil of that period.[47] In fact he has given certain rules for the "Tamilization" of Sanskrit words. For example, native Tamil words do not begin with [l] and [r] and such of those Sanskrit words that had an initial [l] or [r] should, according to the author of "Nannuul", be "Tamilized" by adding a vowel (i, a or u) before the word-initial consonant. Again, in native Tamil words there were no word-initial consonant clusters and the "Nannuul" prescribes that the initial consonant cluster in a borrowed word should be broken by inserting a vowel between the two consonants forming the cluster. Thus, Sanskrit la:b^{h}a: was Tamilized to ila:pam ; rat^{h}a: to iratam ; gra:ma: to kira:mam and praka:ʂa: to piraka:tʃam.

1.6.17 But if one takes into account common features of normal spoken Tamil, one is bound to feel that these rules of Tamilization apply only to writing. This is because people freely use word-initial consonant clusters, word-initial voiced stops, word-initial [l] and word-initial [r] in their speech. The four words cited above, in the speech of many,

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47. Ganeshsundaram, P.C. and Vaidyanathan, S. have summarised the views of the author of "Nannuul" in their article "An evaluation of Sanskrit loan words in Tamil from the point of view of 'Nannuul' ". See Indian Linguistics, Turner Memorial Volume, 1958-59, 63-70.

are [laːβx̆] (profit), [raðx̆] (chariot), [gɾaːmx̆] (village) and [pɾəɲaːɸx̆] (splendour) respectively. In short we hear in modern colloquial Tamil several phonological phenomena that were perhaps not found in ancient Tamil. In fact grandmothers all over the Tamil-speaking world begin their tales [woɾo uːɾlɛ woɾo raːʤaː ɪɾiɳɖ̃ːɳɖ̃ː / ɑvx̆ woɾo naːl woɾo gɾaːməʈ̚ʻikʻi pʻoːnɑ̃ː] [48] These two familiar sentences display several phonological features which would have been unacceptable to the author of "Nannuul" - word-initial [r], word-initial voiced stop [g], word-initial consonant cluster [gɾ] and word-final nasal vowels.

1.6.18 What traditional minded grammarians refuse to see is that the Tamil that is spoken to-day is not the Tamil that might have been spoken in the days of the "Tolkaappiyam" and "Nannuul". It is no longer Tamil with nothing but Tamil words. Several people attempt, not always particularly successfully, to write such "pure" Tamil, but no one speaks such Tamil.

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48. Once upon a time there was a king. One day he visited a village.

1.6.19 The difference between formal Tamil and two of the colloquial varieties has been established earlier in this chapter (see 1.5.5 to 1.5.7) with three versions of "The North Wind and the Sun". It is perhaps not out of place here to quote Matthews (1942) and Bright and Lindenfeld (1968). Matthews observes and one feels, quite rightly, "It is a common experience for the foreigner learning Tamil to discover to his dismay that after months of study with grammar and reader and munshi he is able to understand scarcely anything of the language spoken around him. In the villages and the fields, in the bazaars and on the highroads he hears a language spoken which he finds it hard to believe is the language of his study".[49] This is because pandits and munshis teach a foreign learner formal Tamil that is nowhere the medium of conversation. They somehow fail to realize that the dialect of a language that should be taught to people who wish to converse in that language is the colloquial dialect (in the case of Tamil one of the colloquial dialects) and not an imaginary prestige dialect. In the words of Bright and Lindenfeld, "... most published materials on Tamil deal primarily with

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49. Matthews, Gordon (1942, 992)

the literary variety ... The prestige of the literary variety is so great that educated Tamilians have been known to persuade themselves that literary Tamil is their everyday spoken language; this delusion has in some cases been taken as fact by foreign linguists, resulting in alleged descriptions of colloquial Tamil which in fact apply only to very formal styles of speech".[50]

1.6.20 Apart from the many Sanskrit words that form part of the active vocabulary of the Tamil speaker, there are many English, Hindi, Urdu, and Portuguese words in the speech of every Tamil speaker. [roṭ:ɪ] (bread) is Hindi; [ʈ̪ʻɷpˑɑ:kˑɪ] (gun) is Hindi; [ʤɑ:ɽɪ] (jar) is Marathi; [krɑ:mbɨ] (cloves) is Urdu; [lɑ:ɽx̆] (horseshoe) is Urdu; and [rɑmbx̆] (saw - n) is Telugu. English words like "corporation, election, vote, doctor, engineer, bus, tram, ticket, bulb, fan, pencil, mile, furlong, kilometer, kilogram, toothpaste, bootpolish, petrol, car, battery, sweater, tea, coffee, biscuit, jam, horlicks, radio, (news)paper, gramophone, tape-recorder, soap" occur very freely in the speech even of uneducated people. Many of these do have Tamil equivalents, coined after they were introduced to the public, but in the speech of many

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50. Bright, W and Lindenfeld, J (1968, 30)

people, the English words occur and not the Tamil equivalents.

1.6.21 It is therefore felt that these "loan" words have to be taken into account when attempting a phonetic/phonemic analysis of modern Tamil. Instead of separate phonological systems - one for "pure" Tamil, another for Sanskrito Tamil and so on - a single system embracing all the lexical items irrespective of their etymology would be the ideal thing if one is attempting a linguistic analysis of Tamil as it is SPOKEN to-day.[51] Such attempts have been made in the past on a small scale.[52] Such an attempt is made in this thesis.

1.6.22 The following pages are a phonetic study of colloquial Tamil. The vowels and consonants that occur in the dialect are analysed elaborately with instrumental evidence. A brief phonemic analysis is attempted at the end.

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51. Frequency of occurrence has been taken into account. [f] and [z], for example, have been omitted from the Tamil system though both these occur in loan words. [f] occurs, to the present writer's knowledge, in not more than six words and [z] only in the word [zu:] (zoo). See Fairbanks (1957).

52. See Bright, W and Ramanujan, A.K. (1961) and Meenakshisundaran (1965).

Chapter II

The Orthography of Tamil.

(pages 43 - 57)

Chapter II

2 The Orthography of Tamil

2.1 General Remarks:-

2.1.1 In the Tamil orthography one comes across three types of letters:

(a) Pure vowel symbols - these can occur only initially in a word in spelling.

(b) Pure consonant symbols - these symbols are characterized by a dot above the symbol thus: ப், ம். These symbols occur only medially or finally in a word in spelling. In isolation, these symbols are pronounced with a central or front vowel before it. [1]

The same symbol without the dot is a combination of the particular consonant and the vowel [a].[2] This brings us to the third type of symbols:

(c) Vowel-Consonant symbols. Each of these is a combination of the undotted consonant symbol and a secondary vowel symbol.

These are discussed elaborately later.

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1. The two symbols given here are pronounced [ɨp] and [ɨm] in isolation. Some people pronounce these [ɪp], [ɪm] etc.
2. The two symbols given above without the dot will be [pa] and [ma] respectively.

2.1.2 Of the four literary Dravidian languages (Tamil, Telugu, Malayalam and Kannada - See 1.1.1) Tamil has the minimum number of orthographic symbols. This paucity in orthographic symbols is responsible for one symbol representing two or three sounds. The orthographies of Telugu, Malayalam and Kannada have a considerably larger number of symbols; in fact the additional symbols make the graphemic inventory of these languages more like that of the Devanagari alphabet of Sanskrit. For example, in the writing systems of Telugu, Malayalam and Kannada (as in those of most Indo Aryan languages) there are separate orthographic symbols representing the unaspirated and aspirated versions of the stop consonant sounds. Thus we have, in these languages, one orthographic symbol representing [p], another representing [p^h] a third representing [b] and yet another representing [b^h].[3] Similarly, there are four symbols representing the dental stop series [$\underset{\sim}{t}$], [$\underset{\sim}{t}^h$], [$\underset{\sim}{d}$] and [$\underset{\sim}{d}^h$]; four symbols representing the retroflex stop series [ṭ],

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3. The symbol [b^h] stands for the "voiced aspirated" bilabial stop [b]. Abercrombie's (1967, 149) words concerning such stops are worth quoting: "The term 'aspirated' is also used in conjunction with the term 'voiced stop', but it then has a fairly different sense ... Many languages of India ... possess 'voiced aspirated stops' and their characteristic is that they are followed by a vowel pronounced with 'breathy voice' ..."

[t^h], [ɖ] and [$ɖ^h$]; four symbols representing the velar stop series [k], [k^h], [g] and [g^h] and four symbols representing the palato-alveolar affricate series [tʃ], [$tʃ^h$], [dʒ] and [$dʒ^h$]. In Tamil, on the other hand, there are just four orthographic symbols, one each representing each series of stop sounds and one orthographic symbol representing the palato-alveolar affricates [tʃ] and [dʒ]. Thus, in Tamil, one orthographic symbol represents [p], [p'][4] and [b], another represents [t̪], [t̪'] and [d̪], another represents [ʈ], [ʈ'] and [ɖ], another represents [k], [k'] and [g] and a fifth represents [tʃ] and [dʒ]. In addition to representing the voiceless and voiced stops, the stop symbols [5] represent voiced fricatives and, in the case of retroflex, voiced flap. Thus p̲ represents [β], t̪̲ represents [ð], ʈ̲ represents [ɽ] and k̲ represents [ɣ] in addition to representing the stop sounds referred to above. The orthographic symbol tʃ̲ represents [c] in addition to representing the palato-alveolar affricates [tʃ] and [dʒ].

2.1.3 There are twelve orthographic symbols in

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4. Slightly aspirated voiceless bilabial stop. For a fuller discussion of aspiration of voiceless stops see chapter VI.

5. These are called "stop symbols" because these, in isolation, are read as [pa], [t̪a], [ʈa] and [ka] respectively.

Tamil representing the vowels [6] and eighteen representing the consonants. These thirty orthographic symbols formed the Tamil alphabet when the alphabet was devised.[7] These symbols are given below. Underneath each symbol is an I.P.A. symbol and this I.P.A. symbol shows how each letter of the Tamil alphabet is read in isolation (e.g., as when spelling a word).

2.2 VOWEL SYMBOLS

2.2.1

அ	ஆ	இ	ஈ	உ
a	a:	i	i:	u

ஊ	எ	ஏ	ஐ	ஒ
u:	je	je:	ai	wo

ஓ	ஔ
wo:	au

2.3 CONSONANT SYMBOLS

2.3.1

க்	ங்	ச்	ஞ்	ட்	ண்	த்	ந்	ப்
k	ŋ	ʧ	ɲ	ʈ	ɳ	t̪	n	p

ம்	ய்	ர்	ல்	வ்	ழ்	ள்	ற்	ன்
m	j	ɾ	l	ʋ	ɻ	ɭ	r	n

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6. The term 'vowel' here includes both 'pure vowels' and diphthongs.
7. There are five other symbols which were added on to the Tamil orthography in later times. These are discussed a little later.

2.4 The Orthographic Symbols - a general discussion:-

2.4.1 The symbol ஆ , for example, is read as [a:]. Children are taught when they learn the Tamil alphabet that the symbol ஊ is [u:], ஈ is [i:] and so on.

2.4.2 In addition to the thirty symbols given above, there are five other symbols representing consonants. When loan words from Sanskrit crept into the vocabulary of Tamil, the need for more orthographic symbols must have been felt and five symbols from the Grantha alphabet were borrowed.[8] These are:-

ஸ்	ஷ்	க்ஷ்	ஹ்	ஜ்
s	ṣ	kṣ	h	ʤ

2.4.3 Apart from the twelve orthographic symbols representing the vowel sounds, there are other orthographic symbols which are used in combination with the consonant symbols to form what have been traditionally called "vowel consonants" - syllables. These symbols are either written before the consonant symbol (e.g., ே is the symbol written before the consonant symbol க to form <u>ke</u>:), or after the consonant symbol (as in கா to form ka:), or one before and one after the consonant symbol

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8. There are purists who, as a rule, avoid using these borrowed orthographic symbols.

(as in கோ to form ko:) or attached to the consonant symbol (as in கி to form ki). Thus a pure consonant symbol is always marked by a dot on the symbol as in க் [k]. If the dot is removed, the symbol will represent [kə]. Then the various secondary symbols are used to represent the consonant in combination with various vowels. Thus the word majil (peacock) has only three orthographic symbols in Tamil writing - மயில் ; ம represents [m+ə] யி represents [j+I] and ல் represents [l]. This is illustrated below with one consonant symbol in combination with the various secondary vowel symbols.

க்	க	கா	கி	கீ	கு	கூ	கெ
k	kə	kə:	ki	ki:	ku	ku:	ke

கே	கை	கொ	கோ	கௌ
ke:	kai	ko	ko:	kəo

2.4.4 In Tamil writing, an orthographic symbol representing a "pure consonant" can never occur initially in a word. Thus the word [prə:ɳI] (living being) is never spelt prə:ɳi but pirə:ɳi, the word-initial letter being பி (pi) - a single symbol which is a combination of a consonant and a vowel. Several such words are pronounced with a word-initial consonant cluster, but in writing, the word-initial letter should either be a vowel symbol or a symbol representing a consonant + vowel.

2.4.5 The Tamil orthography must once have been

unmistakably unambiguous [9] and though each orthographic symbol (particularly the ones representing the stops and affricates) may have represented many sounds (as they still do to-day) this does not mean that there would be confusion in the mind of a native speaker of Tamil. Some of the symbols and the sounds they represent are tabulated below:-

Orthographic symbol	Initially in a word	Intervocalic orthographic single consonant	Intervocalic orthographic double consonant	Medially after a nasal consonant
ப	[pʻ] [10] [pʻɑɕɪ] (hunger)	[β] [ɑ:βɑṯʻɨ] (danger)	[pʻ] if preceded by a long vowel and [p:] if preceded by a short vowel in disyllabic words. [pʻ] in polysyllabic words irrespective of the length of the preceding vowel. [ɑp:ɑ:] (father) [kɑ́:pʻɪ] (coffee) [ɕɑ:pʻɑ:ṛɨ] (meal)	[b] [ṯʻɑmbɪ] (younger brother) [ɑnbɨ] (love)

9. With more and more loan words from Sanskrit, Hindi, English, etc., being used freely by Tamil speakers in their speech and writing, the orthography of Tamil can no longer be considered in any sense unambiguous. Thus there is one symbol representing [p] and [b] and both [pʻɑlɑ̃] (a tiny weight) and [bɑlɑ̃] (strength) are written palam now and numerous examples of this kind can be found.

10. Slightly aspirated voiceless bilabial stop. For a full discussion of aspiration of voiceless stops, see chapter VI.

Orthographic symbol	Initially in a word	Intervocalic orthographic single consonant	Intervocalic orthographic double consonant	Medially after a nasal consonant
t	[t̪ʻ] [t̪ʻɑp:ɨ] (fault)	[ð] [kʻɑ:ðɨ] (ear)	[tˑ] or [t̪:] depending upon length of preceding vowel in disyllabic words. [tˑ] in polysyllabic words, irrespective of length of preceding vowel. [pʻɑt̪:ɨ] (ten) [pʻɑ:tˑɪ] (flower-bed) [kʻɑt̪ˑɑ:ʐɛ] (cactus)	[d̪] [pʻand̪ɨ] (ball)
t	[tʻ] or [t][11] [tʻi:]~[ʈi:] (tea)	[ʈ] [pʻɑʈɪ] (measure)	[ʈ:] or [ʈˑ] depending upon the length of preceding vowel in disyllabic words. [ʈˑ] in polysyllabic words, irrespective of length of the preceding vowel. [pʻɑʈ:ɨ] (silk) [pʻɑ:ʈˑɨ] (song) [pʻɑʈˑɑ:lɐ̃] (army)	[ɖ] [pʻu:ɳɖɷ] (garlic)

11. For a fuller discussion of aspiration of [t] see chapter VI.

Orthographic symbol	Initially in a word	Intervocalic orthographic single consonant	Intervocalic orthographic double consonant	Medially after a nasal consonant
k	[k'] [k'ɑɾɪ] (curry)	[ɦ] [naɦɛ] (jewellery)	[k:] or [k•] depending upon the length of preceding vowel in disyllabic words. [k•] in polysyllabic words, irrespective of length of preceding vowel. [ɑk:ɑ:] (elder sister) [p'ɑ:k•ɨ] (areca nut) [ɸak•əɾɛ] (sugar)	[g] [p'ɑŋgɨ] (share)
tʃ	[ɸ] [ɸɑʈ:ɪ] (earthenware vessel)	[ɸ] [p'ɑɸɛ] (glue)	[t͡:ʃ] or [t͡•ʃ] depending upon the length of preceding vowel in disyllabic words. [t͡•ʃ] in polysyllabic words, irrespective of length of preceding vowel. [p'ɑt͡:ʃɛ] (green) [p'u:t͡•ʃɪ] (insect) [p'ɪt͡•ʃɛk•ɑ:ɾɅ] (beggar)	[ʤ] [ɪɲʤɪ] (ginger)

2.4.6 This neat patterning of orthographic symbols and the various sounds they represent does not hold good now because of the innumerable loan words that have become part of the Tamil speaker's active vocabulary. Many of these loan words do not fit

into the above pattern. There are several words with word-initial voiced stops (see 1.6.6 for some such words). Again, there are words like [ʧ i:] (fie!), [ʧ aⁿdaⁿx̆] (sandalwood paste), [ʧ aⁿdɾx̆] (moon), etc., with a word-initial [ʧ].

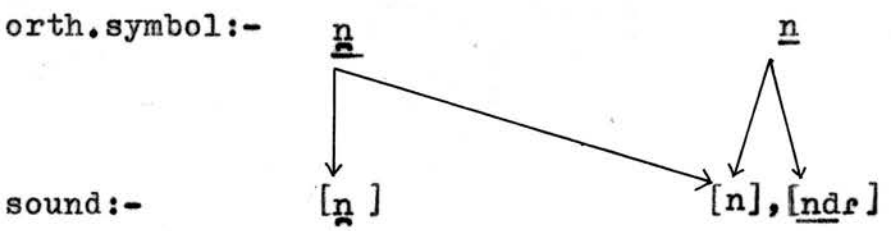
2.4.7 Even among the vowels there is no one-to-one correspondence between orthographic symbols and sounds. For example, there are no orthographic symbols to represent two very frequently occurring vowel sounds - [ə] and [ɨ]. The orthographic symbol i sometimes represents [ɪ] and sometimes [ɨ]. At times u represents [ɨ]. u represents [ɷ], [o] and [wo] as well. [ə] is represented by e and a. There are no orthographic symbols to represent the nasal vowels though nasal vowels are a very common phenomenon in colloquial speech.

2.4.8 One other feature is that some orthographic symbols are zero in speech. Thus the word which is spelt appaṭi (like that) is [ap•əʈɪ] in formal Tamil, but [apʈɪ] in the colloquial dialect under survey. Similarly, vaɾukiɾa:n (he is coming) is [vaɾɨɦɪɾa:n] in formal Tamil, but [vaɾd̆:] in colloquial speech. To cite a third example, appuram (later on) is [ap•ɷɾam] in formal Tamil, but [apɾx̆] in colloquial speech.

2.4.9 Another interesting feature is that there are two orthographic symbols representing [n]. In the

colloquial dialect of Tamil under survey, there is an alveolar nasal [n], a dental nasal [n̪] and a post-alveolar nasal [ɳ]. We cannot say that one of the two orthographic symbols always represents [n̪] and the other always represents [n] and [ɳ]. We have chosen to represent one of these orthographic symbols n̲ to differentiate it from the other which we transliterate with the symbol n. In writing down a word, the orthographic symbol n̲ occurs initially and medially in the consonant group -n̲t̲-. In these positions, the other orthographic symbol n cannot occur in spelling. The orthographic symbol n cannot occur initially. It occurs intervocalically single and doubled, medially in the consonant groups np and nr and finally. In speech, [n] occurs initially, medially in the consonant group [nb], intervocalically (both short and long) and finally. But initial [n] is represented by the orthographic symbol n̲. In speech, [n̪] occurs only in the medial consonant group [n̪d̪] and post-alveolar [ɳ] occurs only in the medial consonant group [ɳɖɾ].

2.4.10 This can be better illustrated with a diagram:



2.4.11 Another interesting case of overlap is that there are two orthographic symbols representing the alveolar tap [ɾ] and the alveolar trill [r]. But again, we cannot say that one of these two orthographic symbols strictly represents [ɾ], and the other strictly represents [r]. In writing, the orthographic symbol ற (which we have chosen to transliterate with the symbol ṟ to differentiate it from the orthographic symbol ர which we transliterate with the symbol r) can occur initially,[12] medially in consonant groups, intervocalically and finally, as illustrated below:

ṟampam	[rambʌ̃]	(saw-n.)
kaṟi	[kʻaɾ]	(charcoal)
aṟṯṯam	[aɾʈʌ̃]	(meaning)
avaṟ	[avəɾ]	(he - honorific)

The other symbol ர (r) occurs in writing intervocalically (and in this position it occurs singled and doubled) and in the medial consonant

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12. According to traditional grammarians this is impermissible. Pure Tamil words do not begin with an orthographic ṟ or r. But when loan words with an initial [ɾ] or [r] were introduced to Tamil vocabulary and these words had to be written down, a vowel was introduced before the initial consonant so when the word [ra:mən] (a proper noun) had to be written down, it was written iṟa:man (see 1.6.16 and 1.6.17). But now-a-days many people write such words without the initial vowel.

group nr. When doubled in intervocalic position, the phonetic realization of orthographic rr is [t̪ɾ] in formal Tamil and [t̪ʰ] or [t̪:] in many colloquial dialects (the length of the [t̪] depending upon the length of the preceding vowel).[13] In fact there are orthographic minimal pairs contrasting the two orthographic symbols ṟ and r. A few of these are given below:

kaṟi	(curry)	-	kari	(charcoal)
paṟi	(horse)[14]	-	pari	(pluck - imp.)
aṟam	(file)	-	aram[15]	(charity)
kaṟai	(border)	-	karai	(stain)

But in speech, in most dialects of Tamilnad, there is no distinction between words having the orthographic symbol ṟ and those having the orthographic symbol r, [ɾ] and [r] being free variants.[16]

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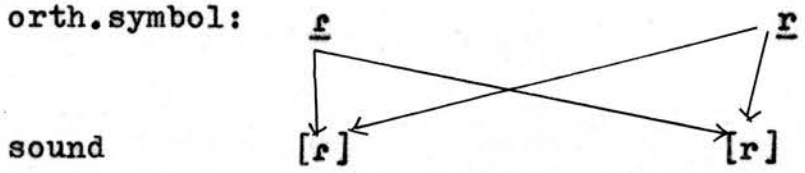
13. For a full discussion of the duration of voiceless stops, see chapter V.
14. A highly literary word, hardly ever used in colloquial speech.
15. A highly literary word, hardly ever used in colloquial speech.
16. For a fuller discussion of [ɾ] and [r] see 7.9.1.1 to 7.9.2.13.

2.4.12 This may be better illustrated with a diagram:



2.4.13 The Tamil orthography, with its economy in orthographic symbols, might have once been very efficient in committing words to writing, but with several loan words with word-initial voiced stops that have become part of a Tamil speaker's vocabulary, it cannot be considered so now. Particularly foreigners learning Tamil find it very difficult to differentiate between words like [pʻalx̌] (a tiny weight) and [balx̌] (strength), both of which are written palam. Modern journals tend to print the latter word palam with a p in bolder type of print. But this becomes cumbersome in writing, and a system to differentiate between the voiceless and voiced stops in writing ought to be devised - perhaps the same symbol could be underscored to represent the voiced version of the stop.

Chapter III

Experimental Techniques Employed

(pages 58 - 84)

Chapter III

3 Experimental Techniques Employed.

3.1 General Remarks:-

3.1.1 Several experimental techniques were employed during the course of the present research in order to check the validity of the statements made on various vowels and consonants that occur in the colloquial dialect of Tamil under survey. A rough idea of the place of articulation of consonants and the tongue-position of vowels was formed on the basis of the author's proprioception and then this was verified with the help of experimental procedures.

3.1.2 Most of the available accounts of the various dialects of Tamil were found to contain statements made by the investigators on the basis of the data they collected from one or two informants and none of these statements was supported by instrumental evidence of any nature.[1] The present writer, therefore, attempted to make use of the available facilities in his departmental laboratory with a view to being able to give precise information on various aspects of the dialect he has examined. A few of the experimental techniques employed by him

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1. The one exception is Švarný and Zvelebil (1955).

are briefly described below:-

3.2 Palatography:-

3.2.1 To check the place of articulation of stops, nasals, laterals and most fricatives, palatography was found a very convenient device. Also with palatography, it was found that the contact or lack of it between the sides of the tongue and the upper molar teeth, or the gums above them, during vowel articulations could be checked.

3.2.2 The type of palatography used was direct palatography.[2] The teeth, the alveolar ridge, the hard palate and the soft palate were thoroughly coated with a marking medium - a mixture of very fine charcoal powder and cocoa. A word with only one of the segments in it capable of wiping off the marking medium when the tongue came into contact with the roof of the mouth was said thrice. The mouth was then opened on to a mirror and the area of contact of the tongue on the roof of the mouth - i.e., the place where the marking medium was removed by the tongue - was thoroughly examined with the help of another mirror. The roof of the mouth was photographed for purposes of keeping a permanent record of the observations made. Before coating the mouth for the next palatogram, the mouth was thoroughly

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2. For full details regarding the use of direct palatography see Abercrombie (1957), Anthony (1954, 1968) and Ladefoged (1957).

washed with water in order to remove even the slightest trace of the marking medium used for the first articulation.

3.2.3 In order to examine how the place of articulation of a particular consonant is affected by the vowel immediately following it in the word, words were chosen with a front vowel, a back vowel and a central vowel immediately after the consonant articulation under investigation. Several such sets of palatograms were made. They were all examined carefully before coming to any conclusion on the articulation of consonants.

3.2.4 Direct palatography was preferred by the present writer to the older method of inserting an artificial palate into the mouth for two reasons:

(a) With an artificial palate in the mouth, the possibility of articulations being slightly distorted was envisaged.

(b) With direct palatography, it is possible to investigate velar articulations.

3.2.5 The palatograms were interpreted by two methods:

3.2.6 (1) Firth's method of marking the zones.[3] A photograph of the present writer's palate without

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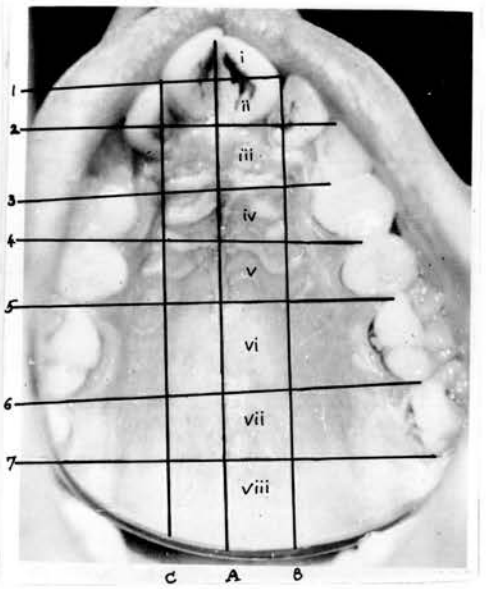
3. See Firth (1948) and Firth and Adam (1950).

any coating is reproduced on the next page, with the various zones marked.

3.2.7 When an actual palatogram of a word is divided into zones in the manner illustrated on the next page, the area of the palate where the tongue must have had contact with it during the articulation of the consonant under investigation can be clearly pointed out and referred to. If, for example, the marking medium has been wiped off in zone 3, we can say that the articulation was an alveolar one. This technique is illustrated below. A word palatogram of the present writer is reproduced immediately after the illustration of the palate without coating. This word-palatogram is divided into the eight zones mentioned on the next page. The palatogram is of the word [ni:] (you). There is a clear wipe-off in zone 3 - the alveolar zone. In the zones above and below the alveolar zone the marking medium is left untouched by the tongue. In the word [ni:] the initial consonant [n]alone is capable of giving a wipe-off on the roof of the mouth. The other sound in the word is a vowel, during the articulation of which the main body of the tongue does not come into contact with the roof of the mouth. On the sides of the palatogram, we see a wipe-off extending from the fourth molar below right up to the canine teeth



Photograph of the author's palate without coating.

The seven horizontal lines are:

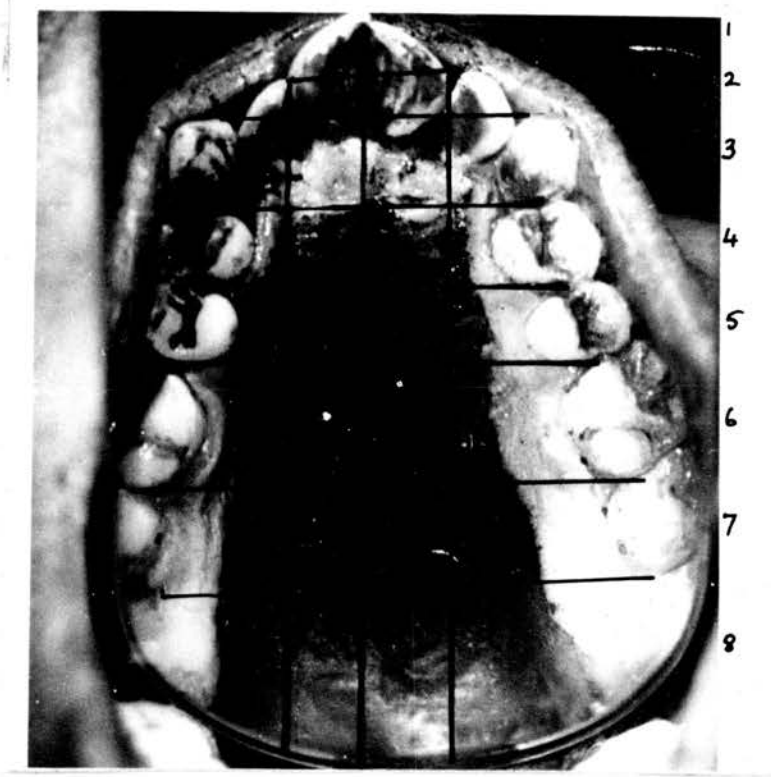
1. incisor line
2. lateral incisor line
3. canine line
4. first molar line
5. second molar line
6. third molar line
7. fourth molar line

The three vertical lines are:

A. The median line
B. The right line
C. The left line

The eight zones, numbered i to viii are:

i. dental zone
ii. denti-alveolar zone
iii. alveolar zone
iv. post-alveolar zone
v. pre-palatal zone
vi. palatal zone
vii. post-palatal zone
viii. velar zone



Pgm. 1 [ni:] (you)

The Zones:

1. dental
2. denti-alveolar
3. alveolar
4. post-alveolar
5. pre-palatal
6. palatal
7. post-palatal
8. velar

above. This wipe-off on the sides is caused by the sides of the tongue during the articulation of the front vowel [i:] which follows the nasal consonant [n] in the word chosen for investigation. Clearly, there may also be contact between the sides of the tongue and the sides of the oral cavity during the consonant closure. We cannot be absolutely certain about the wipe-off along the middle of the palate having been effected during the consonant articulation and the wipe-off along the sides having been effected during the vowel articulation by looking at the palatogram, since all the palatograms made are word-palatograms. So from the palatogram reproduced on the previous page, we can say that the consonant [n] is articulated in the alveolar zone in uttering the word [ni:]. Several palatograms were made to examine the tongue-palate contact during the articulation of consonant sounds. A selected few are reproduced in this thesis. All palatograms included in this thesis in support of the statements made on the articulation of consonants have been divided into zones as in the illustration given above.

3.2.8 (2) A second method employed in interpreting palatograms is the one suggested by Ladefoged (1957). By this method it is possible to "convey some

information concerning the shape and depth of the palatal cavity and the position and slope of the alveolar ridge".[4] Each palatogram interpreted in this way is accompanied by a sagittal section of the roof of the mouth and this was obtained by sawing along the midline of a cast of the mouth.

3.2.9 A plaster cast of the mouth was taken in the following manner. A dental tray that fits the present writer's mouth exactly was chosen. It was filled with a dentist's impression material (identica) mixed in water. The tray was then introduced into the mouth and the identica was bitten into with the upper teeth. The identica was allowed to set. After it had set, the tray was removed carefully from the mouth. An impression of the upper teeth and the roof of the mouth was formed in the dental tray. A solution of plaster of Paris and water was then poured into the impression. Great care was taken to see that there were no air-bubbles in the mixture. After the plaster of Paris solidified, the dental tray with the identica impression was removed. Thus a cast of the mouth was obtained.

3.2.10 The point on the roof of the mouth farthest from the dental plane, i.e., the deepest point of the palate, was fixed. From this point three contour lines at 0·2" intervals were drawn on the cast.

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4. Ladefoged (1957, 766).

The cast, with the contour lines drawn on it, was photographed and enlarged to natural size. Then the cast was sawn along the midline, thus obtaining a sagittal section of the roof of the mouth. The contour lines were superimposed on palatograms, also enlarged to natural size.[5] Each of these palatograms was examined with a diagram of the sagittal section of the roof of the mouth above it.

3.2.11 This was done because "any diagram or photograph of the palate is a two-dimensional representation of information which was originally in three dimensions. A view of the palate from a point at right angles to the dental plane ... preserves the ratio between the length and width of the palate only at the expense of giving an inadequate impression of the depth of the palate".[6]

3.2.12 All the palatograms interpreted by zoning are interpreted in this manner also. This technique, as Ladefoged himself points out,[7] is not infallible, nor is it extremely accurate. But it has been used in the interpretation of many of the palatograms of the present writer because it gives very valuable information which cannot be obtained by looking at a palatogram.

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5. Only two contour lines are superimposed on the palatograms because the third one - the one drawn at 0·6" from the deepest point on the palate - was found to fall outside the roof of the mouth.
6. Ladefoged (1957, 766)
7. Ladefoged (1957, 766)

3.2.13 One factor must be mentioned here. In all the palatograms of the present writer it was found that the wipe-off on the sides was not uniform on both sides. In other words, the two sides of the tongue had not removed the marking medium uniformly. There is more wipe-off on the photographic right (i.e., while viewing the palatogram with the front teeth pointing above and the soft palate below) than on the photographic left. This is perhaps due to an asymmetry in the writer's palate which was observed from the plaster cast of the mouth. With such palatograms it was not possible to arrive at the means of the points at which the sides of the tongue had crossed each contour line. In these cases, the main wipe-off (i.e., the wipe-off caused by the articulation of the consonant under investigation) has been marked accurately on the sectional diagram. From X-ray photographs and tongue-casts it was found that during the articulation of a consonant the body of the tongue assumes a position approximating to the position for the vowel that immediately follows the consonant in a word. On the basis of this evidence, the presumed position of the tongue during the articulation of the consonant has been marked (with dashed lines) on the sectional

diagram.[8]

3.2.14 The palatogram of the word [ni:] (you) which is illustrated on page 64 is reproduced on the next page, this time reduced to natural (life) size. Above the palatogram is a sectional diagram of the roof of the mouth. The wipe-off caused by the articulation of [n] has been transferred on to the sectional diagram. The position assumed by the main body of the tongue is also marked with dashed lines.

3.3 Kymography:-

3.3.1 The instrument used for making all the kymograms reproduced in this thesis is the Electro Aerometer, type AM 508/4 made by Messrs. B. Frøkjær-Jensen, Denmark. The aerometer registers the inspiratory and expiratory air flow both through the nose and the mouth separately on four channels. There are four nickel-plated brass tubes which are placed on a mask with rubber edges. Each tube contains a rubber valve, a lamp and a photo-diode. The valve is made of thin, elastic rubber in two abutting planes. When being blown into, the valve opens soundlessly and at the beginning of an inhalation it closes

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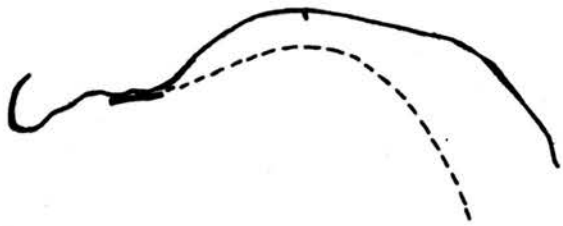
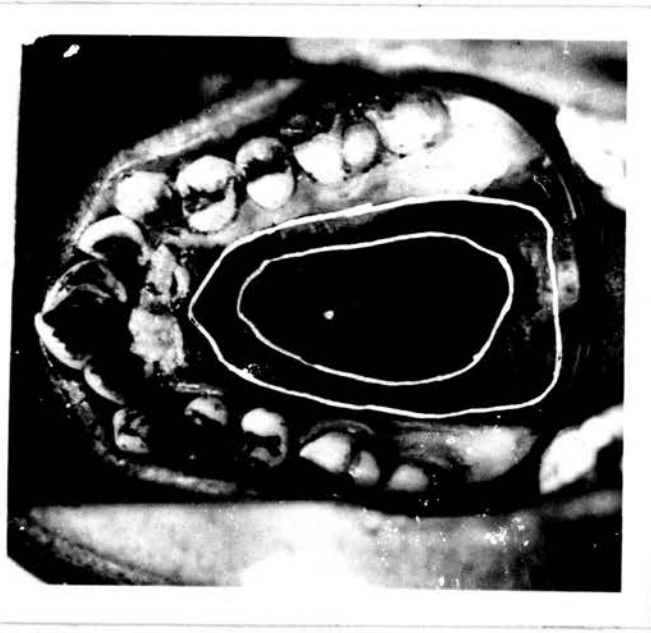
8. This point was raised with Ladefoged (private oral communication) and some palatograms with irregular side wipe-off were shown to him. The solution adopted here has Ladefoged's approval.





Pgm. 2 [ni:] (you)

Life-size print with a sectional diagram of the roof of the mouth above. The thick line on the sectional diagram shows the point of contact during the articulation of [n] . The dashed line shows the presumed position of the main body of the tongue.

immediately. The amount of opening of the four valves can be used as a measure of the oral or nasal air flow - one each for oral and nasal exhalations and one each for oral and nasal inhalations. Any one or more of these can be switched off while using the aerometer.

3.3.2 The mask used is a type of oral/nasal mask with a complete aero-dynamic separation between nose and mouth. When the mask fits the face of the investigator exactly, no air can escape outside. There is no mechanical pressure exerted on the sides or the dorsum of the nose because of the presence of the mask. The mouth is enclosed by the main rubber-ring in such a way that the movements of the jaws and the lips are unimpeded.

3.3.3 The aerometer is connected to a mingograph that writes on a roll of paper. When the valves are at rest, i.e., when the investigator does not utter anything, the mingograph draws straight lines on the paper. When the valves work, i.e., when the investigator says something into the mask, the air flow is recorded on the paper.

3.3.4 A larynx microphone is connected through the amplifier which records the vibrations of the vocal cords. When the vocal cords do not vibrate - i.e., when a voiceless sound is said into the mask - the mingograph registers this by drawing a straight line

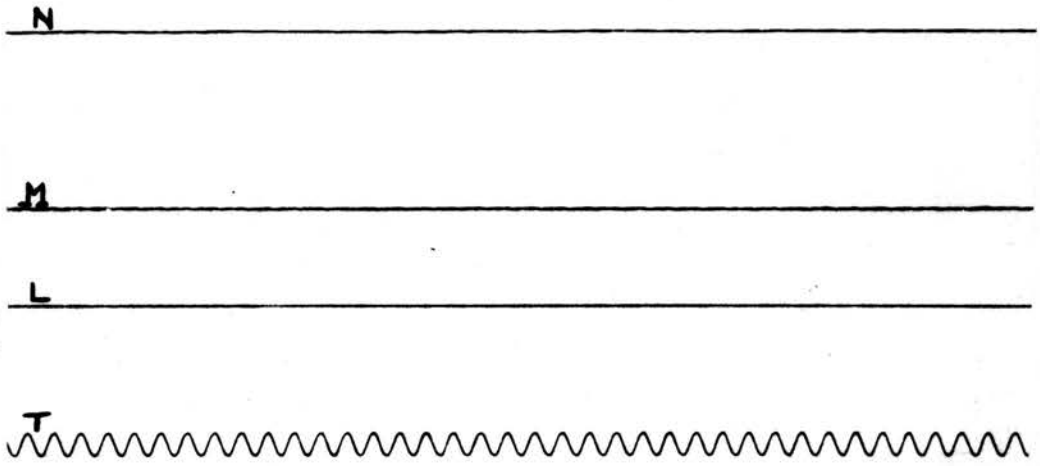
on the roll of paper. The vibration of the vocal cords is registered by a spiky line.

3.3.5 For purposes of this research two out of the four valves were used for making most of the kymograms - one to register the expiratory air flow through the nose and the other to check the expiratory air flow through the mouth. Thus in a kymogram showing four lines, the top two lines are a record of the expiratory air flow through the nose and the mouth respectively. The third line shows the vibration of the vocal cords or the absence of any such vibration. The fourth line always indicates time, recorded in 50 cycles per second. When necessary, more than these two valves were used.

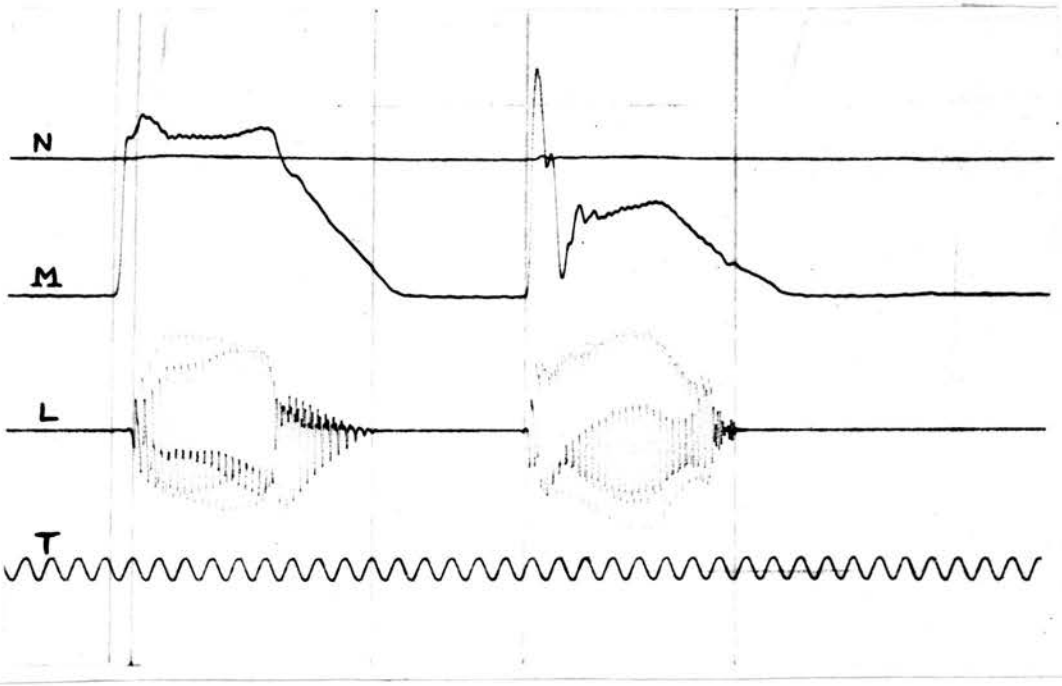
3.3.6 A kymographic tracing made when the valves were at rest and another of the word [kʻu:ʈ•ɑ] (a type of curry) are reproduced on the next page and the four lines explained.

3.3.7 The aerometer was used in the present research to check:-

(1) stop consonants - the release of a stop consonant is marked by a sharp upward peak on the mouth tracing.



Kgm. 1 Valves at rest



Kgm. 2 [kʻu:ʈ·ɔ] (a type of curry)

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

(2) whether the intervocalic stops in the dialect of Tamil under survey which are orthographically represented by two identical symbols are explosives or implosives.

(3) the duration of vowels and consonants. The length of vowels in various phonetic environments and the duration of the voiceless stops were examined.

(4) whether intervocalic orthographic -p-, -t̼-, -t̲- and -k- are stops at all in speech, i.e., whether, during the articulation of these sounds, there is any complete closure at all.

(5) whether the two orthographic symbols in the language to represent the r- sounds[9] are different phonetically - i.e., whether one of the two orthographic symbols always represents a tap and the other always represents a trill. A single tap is characterized by a sudden dip on the mouth tracing indicating a sudden decrease in the air flow, followed by an increase. A trill is marked on the mouth tracing by two or more such 'dips' and 'peaks'.

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9. See chapter II - 2.4.11 and 2.4.12.

(6) whether the voiceless stops in the dialect under survey are aspirated or not. The release of the stops is clearly indicated on the mouth tracing by a sharp upward peak. An examination of kymograms can thus show whether voicing starts simultaneously with the release of the stop or after some time.

(7) the occurrence of oral, nasalized and nasal vowels[10] in the dialect under investigation.

(8) Assimilation involving the state of the glottis.

(9) whether slightly devoiced allophones of voiced phonemes occur in the dialect under survey in word-initial and/or word-final positions.

3.3.8 In short, the combined electro-aerometer-amplifier unit was thoroughly and extensively used in the present research.

3.4 Spectrography:-

3.4.1 Yet another experimental technique employed for purposes of this research was spectrography. The apparatus used was the Kay Sonograph,

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10. The term "nasal vowels" is used to differentiate between accidental nasalization of vowels under the influence of adjoining nasal consonants and essential nasalization of vowels. See 4.3 and 4.4

manufactured by Messrs. Kay Electric Company, New York.[11] The spectrograms made for purposes of this research are

(i) wide-band spectrograms with frequency range up to 4 KC

(ii) narrow-band spectrograms with frequency range up to 2 KC. On the narrow-band spectrograms at this scale, the spectrogram was made to a little above 1 KC in order to accommodate an amplitude display above the spectrogram.

3.4.2 Each spectrogram is calibrated with a scale of frequencies at each end of the paper, multiples of 500 cps being marked by a dark bar. The narrow-band spectrogram shows the continuously changing frequencies of the harmonics, which are all integral multiples of the fundamental frequency. In all the spectrograms reproduced in this thesis, frequency in cycles per second is marked on the vertical axis and time is marked on the horizontal axis (5 inches on the paper represents one second).

3.4.3 The spectrograms were used to countercheck most of the details checked with kymography. In addition, spectrograms were used to obtain some vital

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11. For a detailed description of the principles involved in speech spectrography and a schematic diagram of the sound spectrograph see Potter, Kopp and Kopp (1966, 8-15).

information regarding the acoustic properties of speech sounds, particularly vowels. The formant frequencies of the vowels of the Tamil dialect under investigation were calculated from various spectrograms made for this purpose. In the manner described by Joos (1948) the first and second formant frequencies of the vowels were plotted on a logarithmic graph sheet. The whole procedure adopted has been described in Chapter IV (see 4.1.11 to 4.1.14)

3.4.4 In addition, spectrograms were used to analyse the intonation pattern of the dialect of Tamil under survey. A detailed description of the procedure adopted is given in Chapter XI.

3.5 Speech synthesis:-

3.5.1 Speech synthesis was used to check if the formant frequencies of the speech sounds were correctly interpreted and calculated. The machine used is the Parametric Artificial Talker (PAT for short). The machine is described by Anthony and Lawrence (1962). Wide-band spectrograms with frequency range up to 4 KC and 8 KC and narrow band spectrograms with frequency range up to a little above 1 KC and an amplitude display were made of the utterances to be synthesised. The wide-band spectrogram was segmented. A transparent cover-slip was placed on the wide-band spectrogram and the first,

second and third formants of the speech sounds in the utterance chosen for synthesis were traced. Larynx amplitude, amplitude of Hiss 1 (for aspiration of voiceless stops, release of stop consonants, etc.,) and frequency of Hiss 2 (in the case of fricatives) are also marked on the transparent cover slip. Fundamental frequency is marked by tracing the third harmonic on the narrow-band spectrogram. The whole information is then transferred on to the PAT sleeve in the form of parameter lines in silver (conducting) ink with the help of a grid and fed into PAT. The output is listened to carefully, changes are made on the sleeve if necessary and the PAT utterance is recorded to compare the original utterance and PAT utterance. A few words in isolation and a few sentences were synthesised using PAT and two of the spectrograms made of PAT's version of the sentence are reproduced later.

3.5.2 Another method used for speech synthesis is "Synthesis by Rule". The system used in the Edinburgh Department is that described by Holmes, Mattingley and Shearme (1964) but adapted to make it suitable for PAT. The computer programme is that of the Linguistics Department, Edinburgh University.[12] The parameter values are punched on the paper tape.

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12. See Iles, Work in Progress, Edinburgh University - Department of Linguistics, (1969, (3), 23-25).

There are eight parameters - one each for F_1, F_2, F_3, Larynx amplitude, amplitude of Hiss 1, amplitude of Hiss 2, frequency of Hiss 2 and fundamental frequency. There are three spare parameters, a dummy and a zero time-marker.

3.5.3 A few sentences of Tamil were synthesised by rule and a couple of spectrograms made of synthetic speech are reproduced later.

3.6 X-ray photographs:-

3.6.1 Thirteen X-ray photographs were taken, ten to check the tongue-positions of vowels and three to check the tongue-positions during the articulation of the stop consonants [ṭ], [k] and the approximant [ɻ]. The centre of the tongue was painted with barium sulphate. Monosyllables of the structure CV with [p] as the releasing consonant and the ten vowels as the V element were chosen. The syllables were said several times and once the present writer was sure that the pronunciation of the vowel in question was correct, the vowel position was held and the X-ray taken. Also, X-ray photographs were taken of the closure for [ṭ] and [k] with a front vowel following the consonants in meaningful words. The words were repeated aloud several times and then the consonant closure held and an X-ray taken. In the case of the approximant[ɻ] a word with the

consonant in the middle of it was chosen. The word was repeated several times aloud. Then, only the syllable in which [ʐ] occurred was said, the tongue-position held and an X-ray taken. It is understood that there may be a slight artificiality in the tongue-positions particularly of consonants when the closure was held, but great care was taken to see that during the fraction of a second for which the closure was held, the tongue did not move. Tracings of the X-rays of the vowel articulations are reproduced in Chapter IV. Photographic prints of the 10 X-rays of the vowel articulations form the frontispiece of this thesis and photographic prints of the three X-rays of the consonant articulations are reproduced in appropriate places in Chapter VII .

3.7 Labiograms:-

3.7.1 To check the lip positions during the articulations of consonants, several labiograms were taken. Words with the consonants under investigation being immediately followed by a lip-spread vowel and a lip-rounded vowel were chosen. These words were said several times and then the consonant position held. A photograph of the lips was then taken. A certain amount of artificiality in the lip-position was envisaged in this procedure. It was realized that there was a possibility of exaggerated lip-spreading or lip-rounding when words

were thus said in isolation for purposes of taking labiograms. Three sets of labiograms were taken on three different occasions, with an interval of at least a month between any two occasions. These were studied carefully for any artificialities. Even when the words were pronounced for purposes of taking these labiograms, great care was taken to see that the exaggerations and artificialities were minimal.

3.8 The Trans Pitch Meter:-

3.8.1 For investigations involving pitch the Trans Pitch Meter, made by Messrs. B. Frøkjær-Jensen was used. The fundamental frequency calibration in this apparatus is in 19 different steps, from 60 cps to 450 cps. The Trans Pitch Meter and the aerometer were both connected to a Mingograph and mingograms registering the outward air flow through the nose and the mouth, vocal cord vibrations, and fundamental frequency were obtained. Mingograms of several sentences were made and the intonation patterns were analysed. The intonation curves obtained from these mingograms were then compared with those obtained from narrow-band spectrograms.

3.9 The Intensity Meter:-

3.9.1 The Intensity Meter was used in combination with the Trans Pitch Meter. The Intensity Meter, when connected to a mingograph, registers on paper

the acoustic speech power or intensity. With these recordings, some preliminary and minor investigations were conducted on the phenomenon of stress. Details are given in Chapter XI.

3.10 Tongue casts:-

3.10.1 In addition to the X-rays mentioned in 3.6 a few tongue casts were made to ascertain the tongue-position of stop consonants. A particular word with the stop consonant under investigation was chosen. This word was said aloud several times. Then the word was said just up to that point where the closure for the stop was reached. This closure was maintained. Great care was taken to see that the tongue was as steady as possible. A mixture of dental impression material and water was then injected into the mouth with an "icing bag" as used for decorating cakes. The investigator (the present writer himself) then lay absolutely still till the material inside his mouth solidified. It was then taken out of the mouth carefully and a plaster-cast of this was made. The plaster-cast was sawed carefully. Using this procedure it was possible to get impressions of the upper and lower teeth, the lips, the tongue and the hard palate. The tongue-casts were particularly useful in checking the position assumed by the main body of the tongue during a consonant closure.

3.11 Cine photography:-

3.11.1 Cine photography was found invaluable in ascertaining the position of the lips and the jaws during the articulation of vowels. The entire procedure is described in Chapter IV (see 4.1.23) and the detailed results are tabulated in Appendix II.

3.11.2 These, then, are the various experimental techniques employed during the course of the present research. The use of these techniques furnished a great deal of information. Using instrumental techniques, the present writer was able to alter some of the statements about certain sounds of the dialect made by him earlier.[13] He was also able to verify most of his statements made in this thesis.

3.11.3 One may, on reading these pages and on going through the various instrumental investigations in this thesis, quote Sweet and say: "Instrumental phonetics is, strictly speaking, not phonetics at all. It is only a help... The final arbiter in all phonetic questions is the trained ear of the practical phonetician".[14] As an answer, one can do no better than to quote Ladefoged and admit that "for those of us who are not as skilled as Sweet, instrumental phonetics may be a very powerful aid

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13. Balasubramanian (1970)
14. Sweet (1911) - quoted by Ladefoged (1968, xvi).

and of great use in providing objective records on the basis of which we may verify or amend our subjective impression".[15]

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15. Ladefoged (1968, xvi)

Spectrograms made of synthetic speech. Original
spectrograms are also reproduced for comparison.
(See Chapter III 3.5.9. page 79)

[a p i a: I l i: ɛ I l i: ɛ]
(Isn't father here? No.)

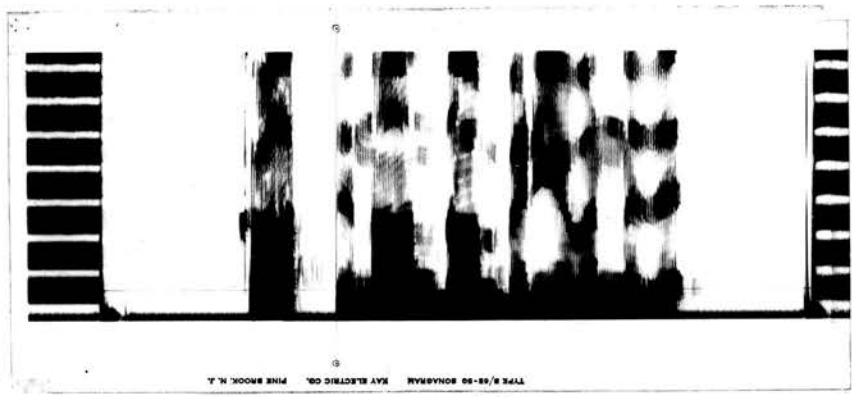
Original Version

[a p i a: I l i: ɛ I l i: ɛ]
(Isn't father here? No.)

Synthetic Speech

Spectrograms made of synthetic speech. Original spectrograms are also reproduced for comparison.

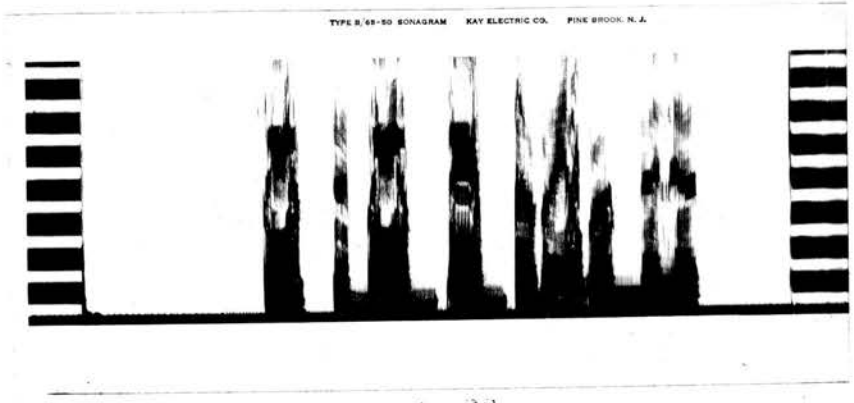
(See Chapter III 3.5.9. page 79)



[k'a:ɪ:ɪ na:ɳda:mbɛ:ɪjaʊɜ:ɪ:ɜ:ɪ]

(The wind said that he was the stronger)

Original Version



[k'a:ɪ:ɪ na:ɳda:mbɛ:ɪjaʊɜ:ɪ:ɜ:ɪ]

(The wind said that he was the stronger)

Synthetic speech

Chapter IV

The Vowels of Tamil

(pages 85 - 226)

Chapter IV

4 The Vowels of Tamil

4.1 Pure Vowels - Oral:-

4.1.1 There are fourteen pure vowel phones in the colloquial dialect of Tamil under survey.[1] Seven of these are long and the other seven short.[2] Various statements have been made by writers on Tamil Linguistics about the quality of these vowels, but to the present writer's knowledge there does not exist a thorough study of the vowels of any dialect of Tamil, formal or colloquial, with instrumental evidence. The present writer therefore decided to make full use of the apparatuses available at the Phonetics Laboratory, University of Edinburgh and thus come to certain reliable and valid conclusions regarding the vowels of his own dialect. Palatography, kymography, spectrography, X-ray photography and cine-photography are the devices used during the course of the present

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1. There is a 15th vowel - one between Cardinal vowels 3 and 4 - which occurs in about half-dozen words only. Because of this low frequency of occurrence, this vowel has been left out of the analysis. See Fairbanks (1957) for a discussion of frequency of occurrence of speech sounds.
2. The "long" vowels are longer than their "shorter" counterparts in identical phonetic environments. For a full discussion of vowel length see 4.2 (4.2.1 - 4.2.9).

research to check the positions assumed by the sides of the tongue during the articulation of the vowels, vowel length, formant frequencies of the vowels, the positions assumed by the main body of the tongue and lip and jaw positions respectively.

Formant frequencies of the vowels:-

4.1.2 To determine the formant frequencies[3] of the pure vowels in the colloquial dialect of Tamil under survey, several wide-band spectrograms with frequency range of up to 4 KC were made.[4] While calculating the formant frequencies of vowels from spectrograms of words, the fact that the formants of the consonants on one side or both sides of the vowels would affect the formants of the vowels was borne in mind. To check the formants of these vowels in their steady state, spectrograms were made of monosyllables of the structure CV with [p] as the releasing consonant. Three of the fourteen monosyllables are meaningful words, seven others are names of letters and the remaining four are nonsense syllables.

---

3. About formants, Ladefoged (1962) says: "The regions of the spectrum in which the frequency components are large (i.e., the regions around these peaks) are known as formants. The formants of a sound are thus aspects of it which are directly dependent on the shape of the vocal tract and are largely responsible for the characteristic quality... It is the presence of these distinctive components (these formants) that enables us to recognise the different vowels which are associated with the different positions of the vocal organs".

4. See chapter III (3.4.1 and 3.4.2)

4.1.3 Three sets of fourteen spectrograms (42 spectrograms in all) were made. The monosyllables were uttered thrice in each case and spectrograms were made of all the three utterances in order to check consistency or the lack of it in pronunciation. Four different sets of spectrograms were made of meaningful words, with the vowels in various phonetic environments like word-initial position, preceded and followed by (as far as possible) the same stop consonants, preceded by a stop consonant and followed by a lateral approximant, preceded by a stop consonant and followed by an alveolar tap, and so on. The syllables and words used in this analysis are transcribed and the first and second formant frequencies of the vowels in them are tabulated.

Table 1:-

4.1.4 Set I - Monosyllables of the structure CV with [p] as releasing consonant.

Syllable	Gloss	F_1				F_2			
		First sample	Second sample	Third sample	Average	First sample	Second sample	Third sample	Average
[pi:]	excreta	300	300	300	300	2230	2250	2225	2235
[pɪ]	name of a letter	375	375	375	375	2275	2275	2300	2283
[pe:]	"	475	450	460	462	2250	2230	2270	2250
[pɛ]	"	560	575	575	570	2025	2050	2050	2042
[pa:]	"	750	750	740	747	1275	1250	1275	1267
[po:]	go-imp	475	475	460	470	875	890	880	882
[po]	name of a letter	500	500	490	497	950	960	975	962
[pu:]	flower	350	320	340	337	750	750	750	750
[pɑ]	name of a letter	375	390	380	382	750	750	750	750
[pɑ]	"	750	740	750	747	1250	1260	1275	1262
[pə:]	nonsense syllable	600	625	600	608	1425	1450	1430	1435
[pə]	"	650	650	625	642	1400	1390	1410	1400
[pɨ:]	"	375	380	375	377	1500	1500	1475	1492
[pɨ]	"	450	430	450	443	1550	1500	1550	1534

Table 2:-

4.1.5 Set II - Word-initial vowels[5] in disyllabic words followed by [ɾ], [ɽ·], [ɽ:] or [ɽ]

word	gloss	F_1	F_2
[i:ɾX]	dampness	300	2200
[ɪɾɨ]	stay-imp.	400	2250
[je:ɾɪ]	lake	475	2150
[jɛɾɪ]	throw-imp.	575	2000
[ɑ:ɾɨ]	six	775	1225
[wo:ɾX]	corner	475	900
[woɾɷ]	one, a	500	950
[u:ɾɷ]	town	350	775
[ɷɾɪ]	peel-imp.	375	800
[ɑɾɛ]	half	800	1300
[ɘ:ɾɨ]	climb-imp.	600	1400
[ɘɽ:ɨ]	eight	650	1550
[ɨ:ɽ·ɪ]	spear	380	1425
[ɨɽɨ]	take-imp.	450	1600

5. except [e:], [ɛ], [o:] and [o] which do not occur in word-initial position without being preceded by an on-glide - the palatal semi-vowel [j] in the case of [e:] and [ɛ] and the labio-velar semi-vowel [w] in the case of [o:] and [o].

Table 3:-

4.1.6 Set III - Medial vowels in disyllabic words.

word	gloss	F_1	F_2
[kʻi:t̪ʻɨ]	thatch	325	2225
[kʻɪt̪:d̪:]	canvas	375	2250
[pʻe:tʻ‿ʃɨ]	speech	475	2200
[pʻɛt̪:ɨ]	having begotten	600	2000
[kʻɑ:tʻɨ]	show-imp.	760	1225
[kʻo:tʻɷ]	coat, jacket	500	900
[kʻot:ɷ]	throw-imp.	550	1000
[kʻu:tʻɷ]	a type of curry	375	775
[kʻɷt:ɷ]	to knuckle	400	800
[kʻɑt:ɨ]	tie-imp.	750	1450
[kʻə:tʻɨ]	having asked	600	1425
[kʻət:ɨ]	having lost	625	1475
[kʻɨ:z̪ɛ]	down	400	1350
[kʻɨz̪ɪ]	tear-imp.	450	1500

Table 4:-

4.1.7 Medial vowels in disyllabic words

word	gloss	F_1	F_2
[t̪ʻi:ɾpɨ]	judgement	325	2100
[t̪ʻɪɾɪ]	wick	375	2150
[t̪ʻe:ɾɨ]	chariot	475	2150
[t̪ʻɛɾɨ]	street	625	2025
[t̪ʻɑ:lɪ]	a chain worn by a married woman	750	1250
[t̪ʻo:lɷ]	skin	500	900
[t̪ʻol:ɛ]	trouble	550	950
[t̪ʻu:ɭᶦ]	a cloth cradle	350	850
[t̪ʻɷɭᶦ]	a drop	375	875
[t̪ʻɑlɛ]	head	750	1350
[t̪ʻe:ɭɨ]	scorpion	600	1450
[t̪ʻəɭᶦ]	sprinkle-imp.	625	1450
[t̪ʻɨ:ʈʻɨ]	sharpen-imp.	400	1500
[t̪ʻɨʈ:ɨ]	scold-imp.	450	1750

Table 5:-

4.1.8 Set V - Medial vowels in disyllabic or trisyllabic words.[6]

word	gloss	F_1	F_2
[pʻi:t̪ʻal]	rags	300	2200
[pʻɪn:al]	plaited hair	400	2250
[pʻe:t̪ʻal]	prattle-n.	475	2100
[pʻɛɾɪɸɨ]	big	575	1950
[pʻa:pʻa:]	child	775	1200
[pʻo:t̪ʻo]	cover(with a blanket)-imp.	475	900
[pʻot̪:al]	hole	500	950
[pʻu:t̪ʻo]	having blossomed	350	775
[pʻot̪:o]	a crevice in which reptiles hide	375	825
[pʻat̪:ɨ]	ten	750	1300
[ɸə:pʻɨ]	red	600	1500
[ɸət̪:ɛ]	rubbish	650	1550
[mɨ:ʈʻɨ]	having redeemed (something)	380	1450
[kʻɨɭɪ]	parrot	450	1550

6. Vowels in the first syllable of each word alone have been taken into account for this analysis.

4.1.9 While checking the formants of vowels from spectrograms of words, it was realized that the formants of vowels are bound to be influenced by the formants of the consonants on one side or both sides of them. It is therefore possible that the formants calculated thus are not accurate. A mid point was chosen when the formants of vowels were seen to rise or fall, influenced by adjoining consonants. It is assumed that at this mid point the influence of the adjoining consonants on the formants of the vowels will be minimal.

4.1.10 All the spectrograms made for this analysis are wide-band spectrograms with frequency range up to 4000 cps, calibrated in frequencies of 500 marked at regular intervals. For calculating the formants of vowels, a straight line was drawn along the 500 cps frequency on the spectrogram. A sheet of tracing paper was then placed on it and the straight line traced. Then the first two formants were traced. The tracing paper was then removed and placed on a graph sheet divided into inches and tenths of an inch. The frequencies were marked on the graph sheet on the same scale as shown on the spectrograms (500 cps for every half an inch. Every tenth of an inch is 100 cps). The tracing paper was then placed on the graph sheet in such a way that the line showing the 500 cps

frequency coincided exactly with the 500 cycles line on the graph sheet. The formants of the vowels traced on to the graph sheet from the spectrograms were then calculated from the graph sheet.

4.1.11 It should be mentioned here that it was possible to calculate the formants of vowels accurately if they were in multiples of hundred since on the graph sheet every tenth of an inch is 100 cps. If thus a particular formant was seen to lie between two tenths-of-an-inch lines on the graph sheet, say between the lines marked 500 and 600, it was difficult to decide accurately if it was 525, 560, 580 or 590. So a formant marked say, 1360 in the Tables above is approximate.

4.1.12 The formant frequencies thus calculated were then plotted on a logarithmic graph sheet calibrated in hundreds of cycles per second.[7] The vertical scale on the logarithmic graph is used for F_1 and the horizontal scale for F_2. The scales, in the words of Joos (1948, 52-53), "are not linear, but logarithmic like the musical scale... Of course, the scales of these diagrams were deliberately set up so as to enhance the resemblance of the acoustic

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7. The whole idea is that of Joos. The graphs reproduced in the following pages are exact copies of the one presented by Joos in Joos (1948, 51 and 131).

chart to the tongue position chart. For the directions in which the two scales run - toward the left and downward, contrary to usual graphical practice - the reason was that this puts [i] at top left and [u] at top right and [a] at the bottom, to agree with the usage of the International Phonetic Association, and for this no apology is needed".

4.1.13 Table 1 on page 89 shows F_1 and F_2 of the Tamil vowels, calculated when the vowels were in steady state. The three samples analysed show that there is no appreciable difference in the formants calculated. So the average of the three samples was calculated and this average has been plotted on the logarithmic graph sheet. The formants calculated from spectrograms of words have been plotted on four different graph sheets. These five graphs are reproduced on the next five pages.

4.1.14 From the acoustic chart of the fourteen vowels obtained from a spectrographic analysis and on the basis of the writer's auditory perception we can say that:-

Vowel No.1 is a close front vowel

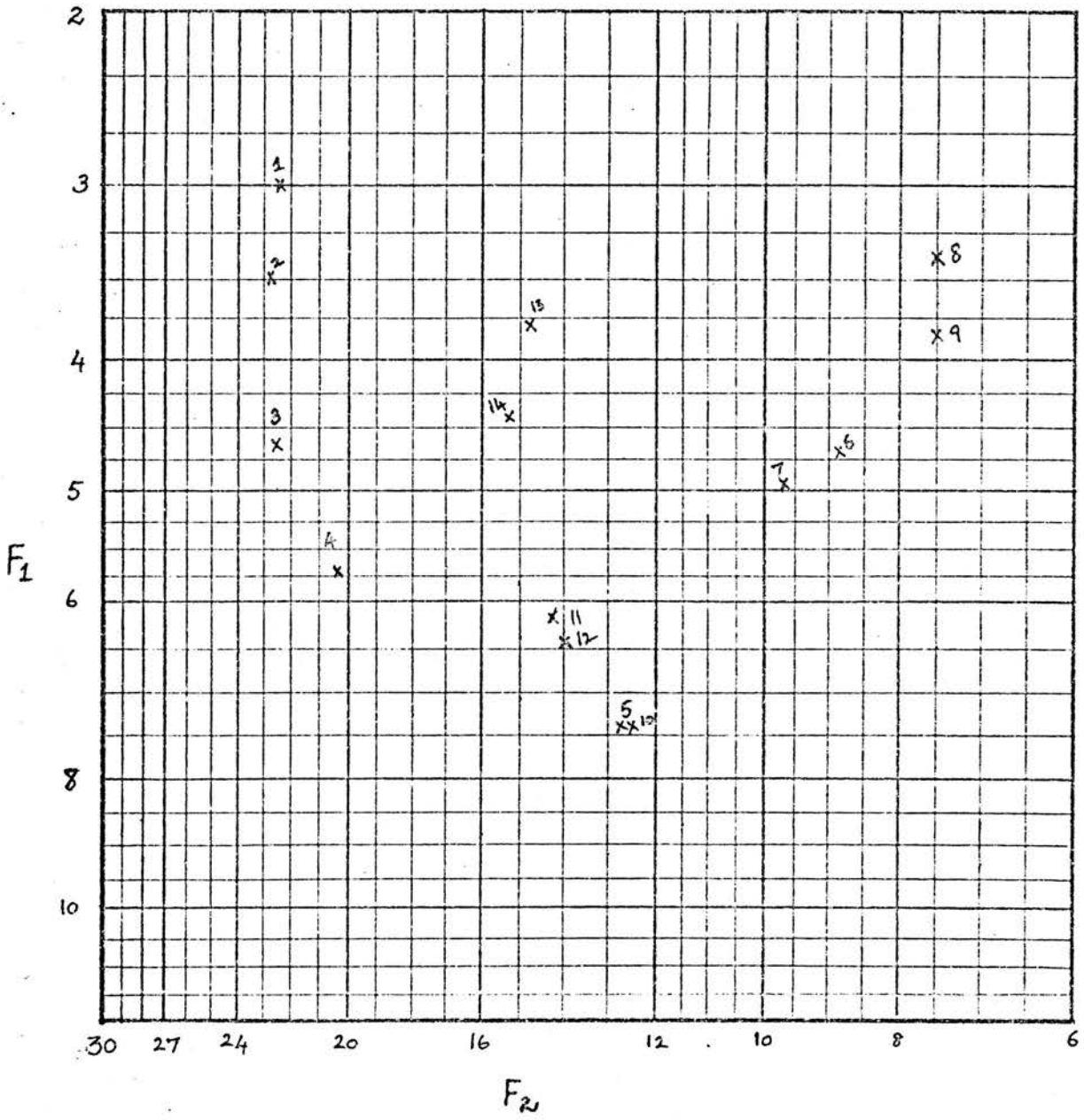
2 is a front vowel between half-close and close

3 is a front vowel between half-close and half open

4 is a front vowel in the half open-open area, nearer half-open than open

5 is an open vowel, more back than front

Figure 1:

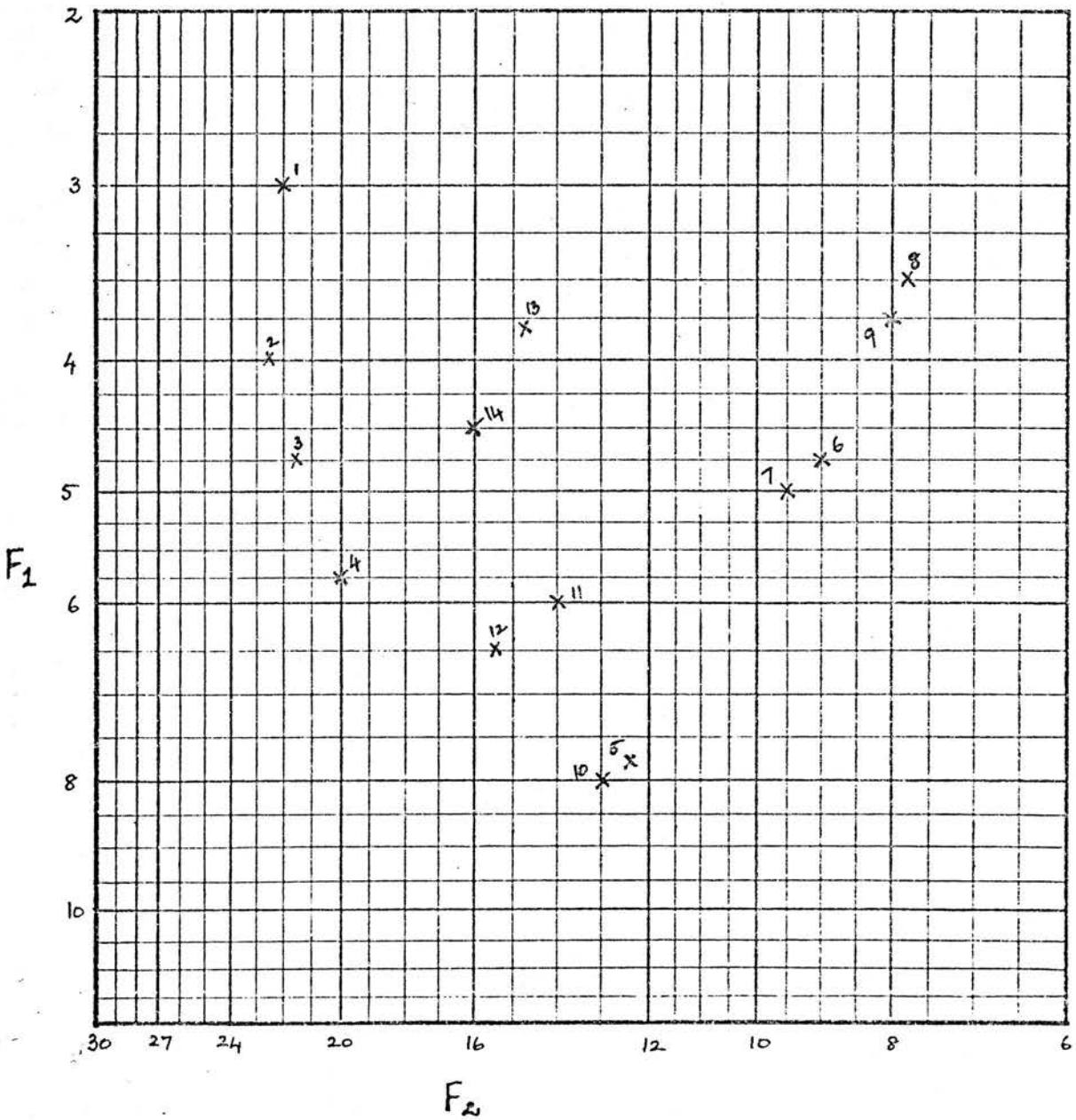


Vowels in Monosyllables of the structure CV

Note i. The C was always [p] .

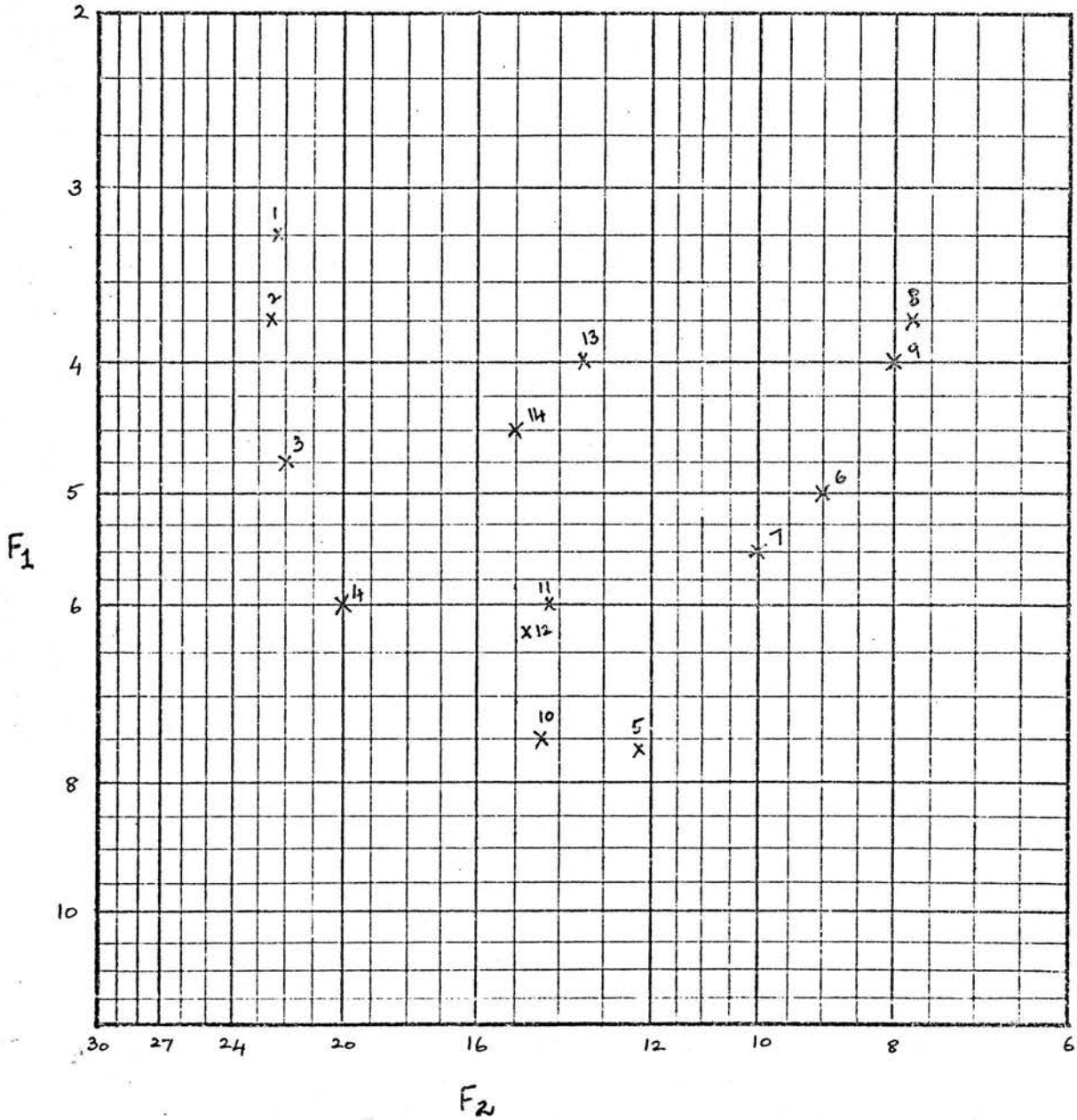
ii. The formant frequencies plotted above are the average of three readings.

Figure 2:



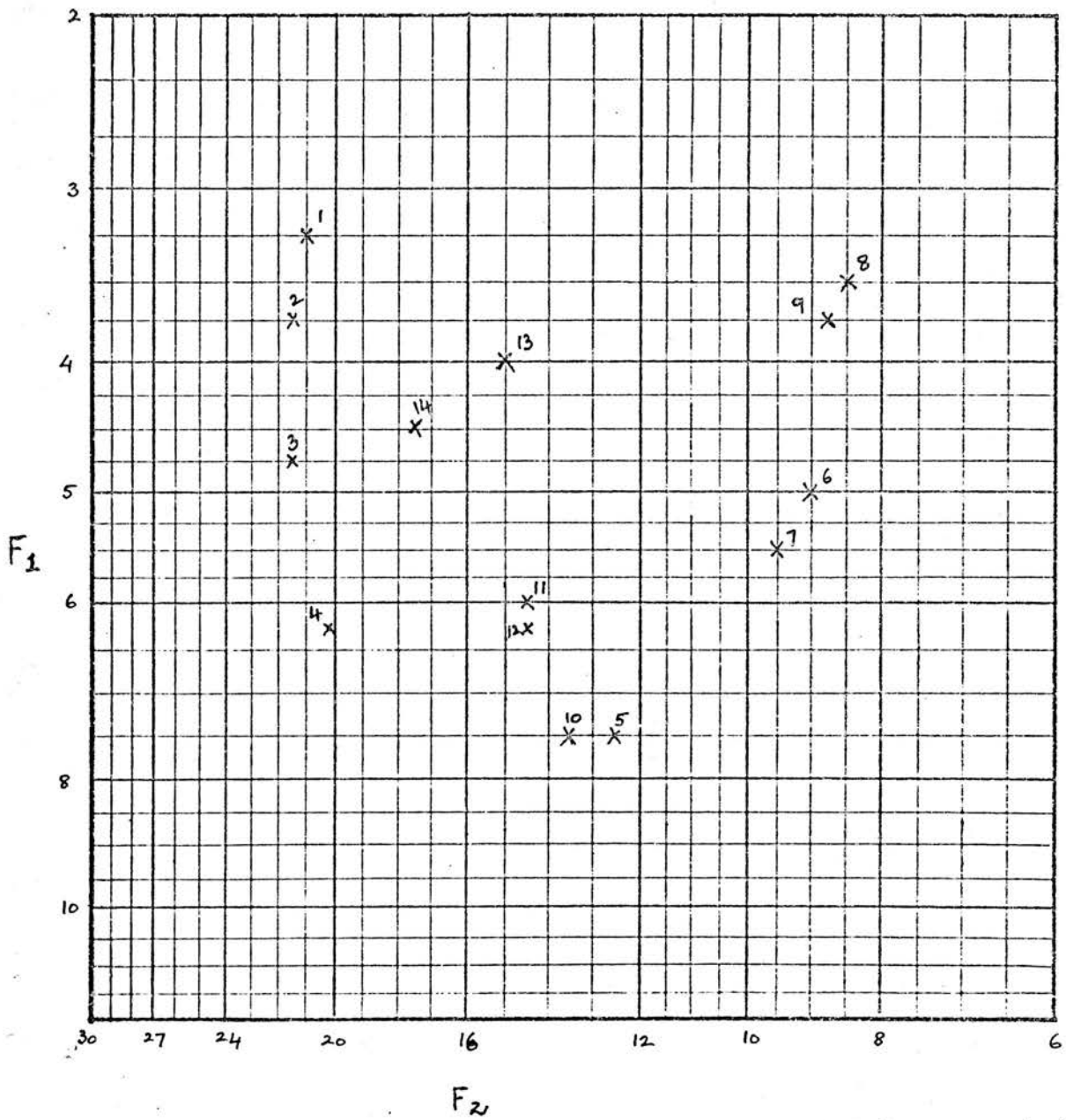
Vowels in word-initial position in disyllabic words--- vowels immediately followed by [ɾ] or [t] .

Figure 3:



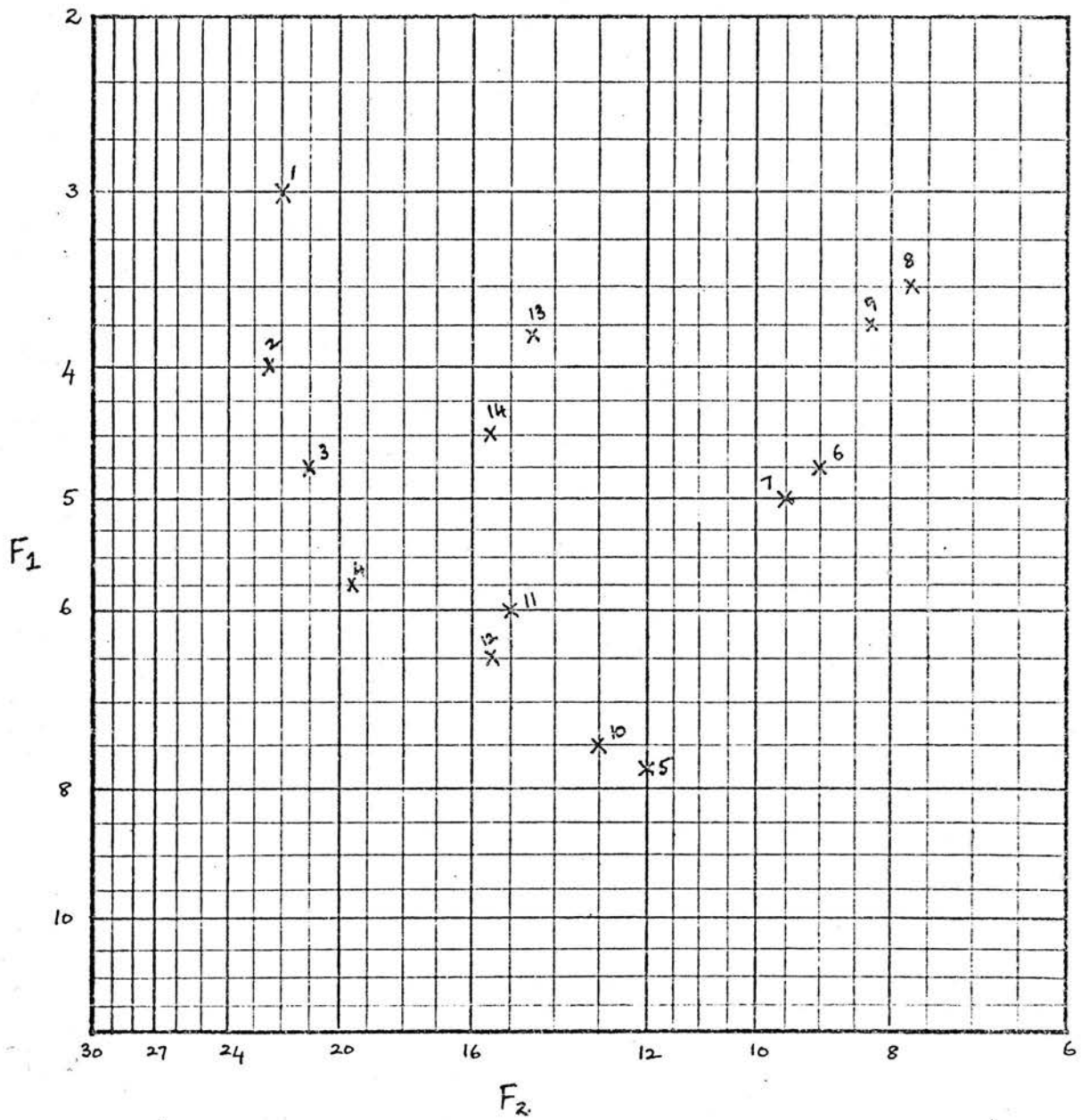
Vowels in disyllabic words-- vowels immediately preceded by [k] and followed by [ʈ͡ʂ] , [ʈʂ] , [ʈ͡ʂʰ] or [ʐ] in the next syllable. Only the vowels in the first syllables have been taken into account for this chart.

Figure 4:



Vowels in disyllabic words-- vowels immediately preceded by [t͡s] and followed by [ɾ] , [l] , [ɭ] or [ʈ]. Only the vowels in the first syllables have been taken into account for this chart.

Figure 5:



Vowels in disyllabic words preceded and followed by various consonants. Only the vowels in the first-syllables have been taken into account for this chart.

Vowel No. 6 is a back vowel between half open and half close

7 is a back vowel between half open and half close

8 is a back vowel very nearly close

9 is a back vowel, opener than 8

10 is an open vowel, between front and back

11 and 12 are central vowels between open and half open

13 and 14 are central vowels in the close-half close area.

4.1.15 On the basis of this analysis, the vowels are symbolized thus:-

1) [i:]
2) [ɪ]
3) [e:][8]
4) [ɛ]
5) [ɑ:]
6) [o:]
7) [o]
8) [u:]
9) [ʊ]
10) [ɑ]
11) [ə:]

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8. In the transcriptions given throughout this thesis, diacritics indicating the openness, centralization, etc., of vowels have been left out for purposes of simplicity of transcription. The preface gives a list of symbols used and the sounds they stand for.

12) [ɐ]

13) [i:]

14) [i] [9]

4.1.16 A few of the spectrograms made for purposes of this analysis are reproduced on the next few pages.

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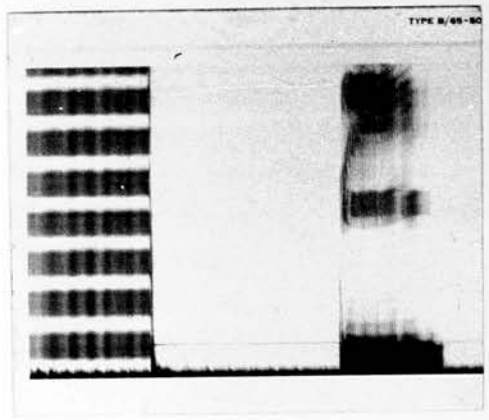
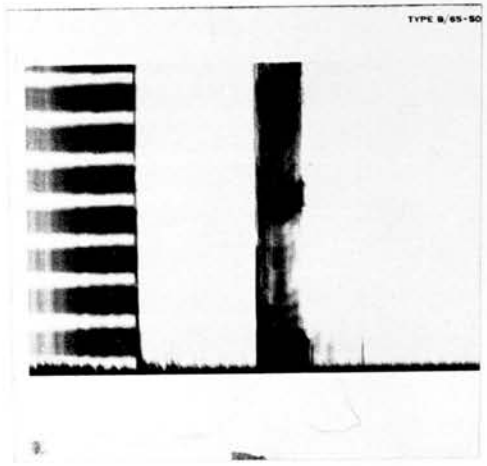
9. Vowels 1, 3, 5, 6, 8, 11 and 13 are notated with the length mark [:] because in Tamil (all dialects - formal and colloquial) vowel-length is distinctive. The vowel marked 1 is always longer than the one marked 2 in identical phonetic environments. The same can be said of vowels 3 and 4, 5 and 10, 11 and 12 and 13 and 14. Vowel-length is discussed elaborately later. See 4.2 (4.2.1 - 4.2.9).

FORMANT FREQUENCIES OF VOWELS.

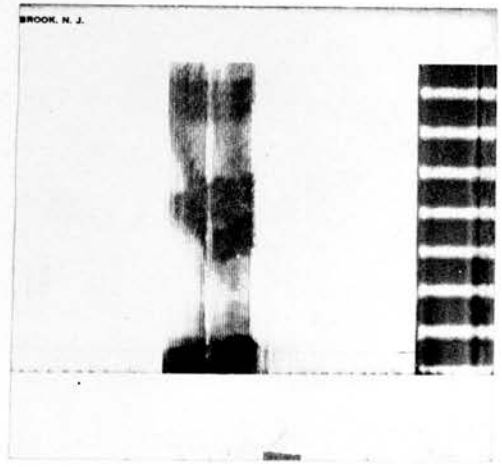


Sgm. 1 [p'i:] (excreta)

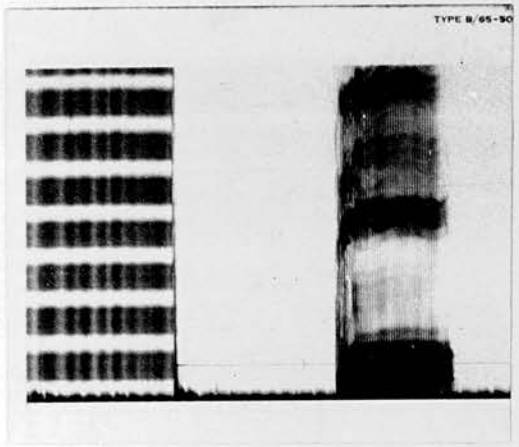
Sgm. 2 [i:rI] (dampness)



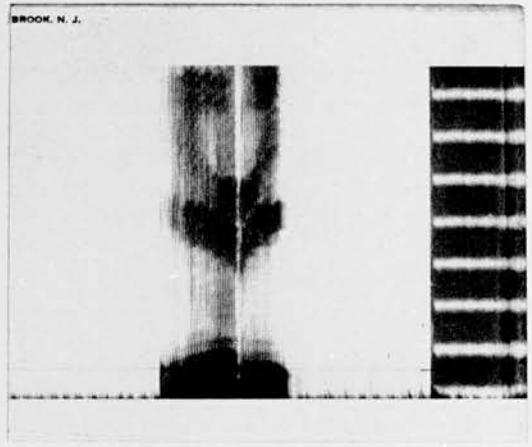
Sgm. 3 [rI] (name of a letter)



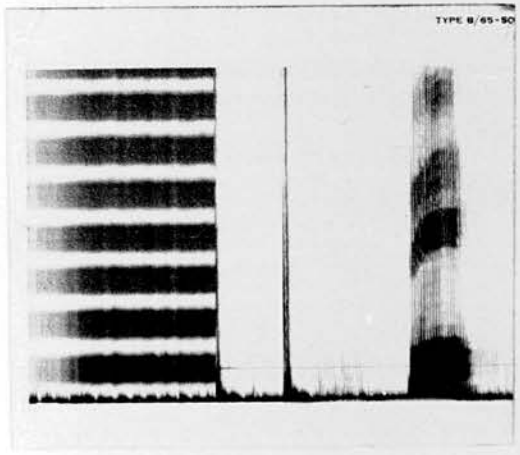
Sgm. 4 [rri] (stay-top.)



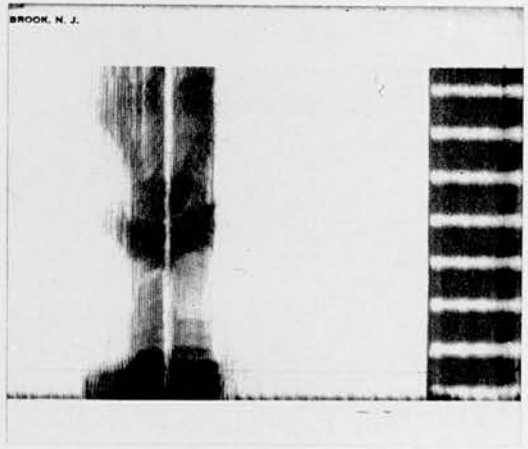
Sgm. 5 [pe:] (name of a letter)



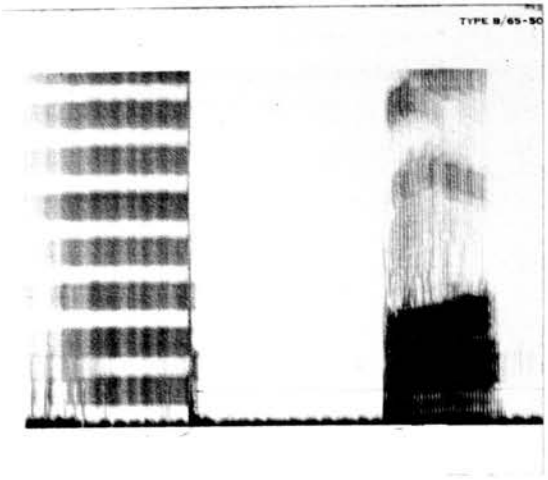
Sgm. 6 [je:ɾɪ] (lake)



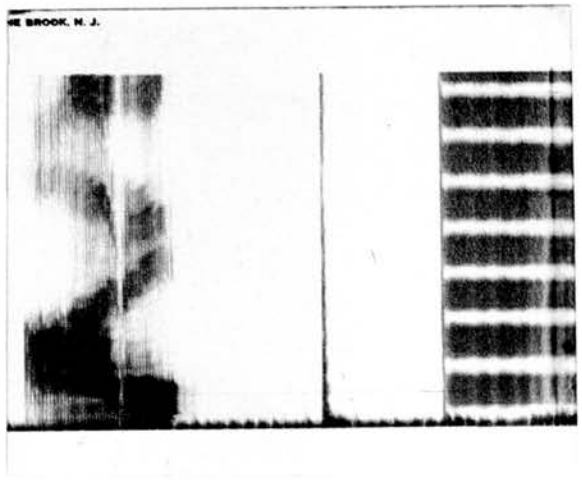
Sgm. 7 [pɛ] (name of a letter)



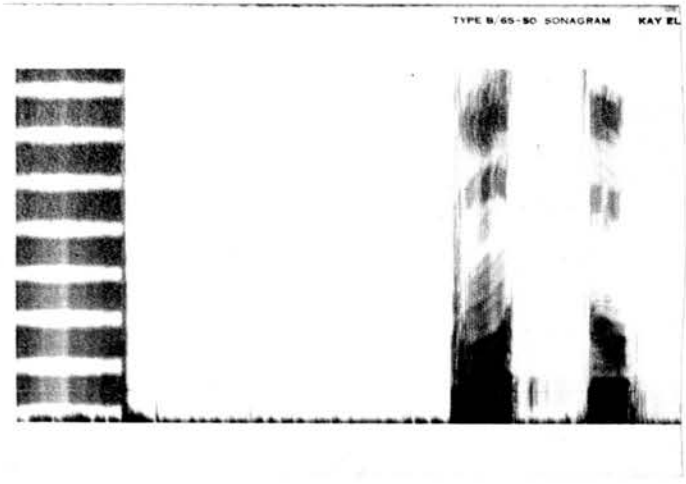
Sgm. 8 [jɛɾɪ] (throw-imp.)



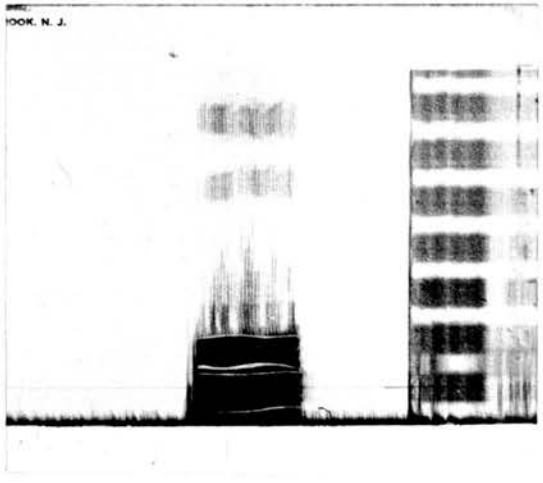
Sgm. 9 [pɑ:] (name of a letter)



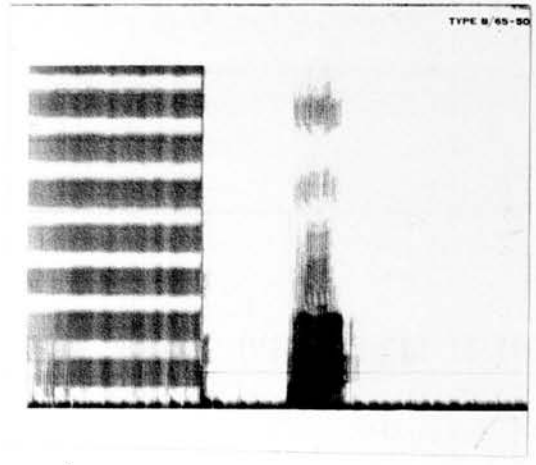
Sgm. 10 [ɑ:ɾɨ] (six)



Sgm. 11 [ɾ o:ɨˈɑ] (cover with a blanket-imp.)

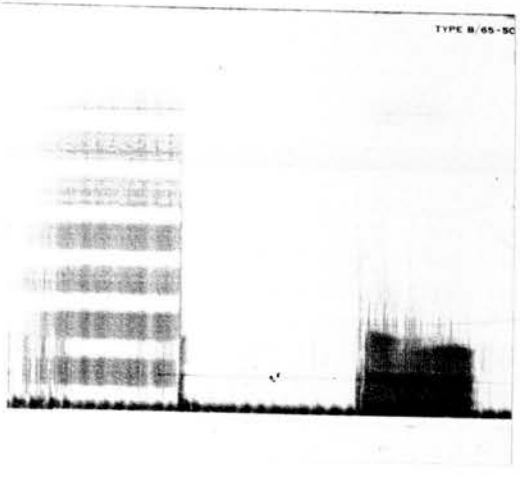


Sgm. 12 [pˈo:] (go-imp.)

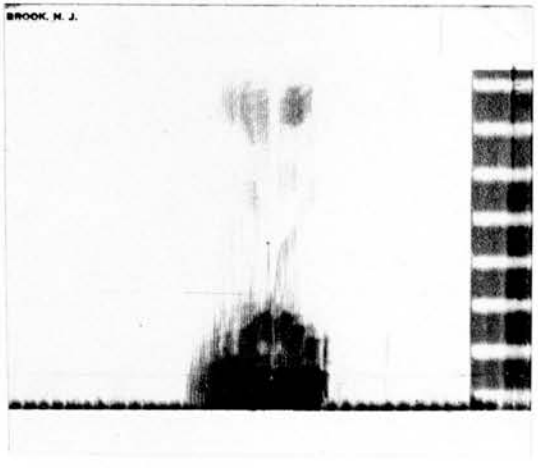


Sgm. 13. [po] (name of a letter)

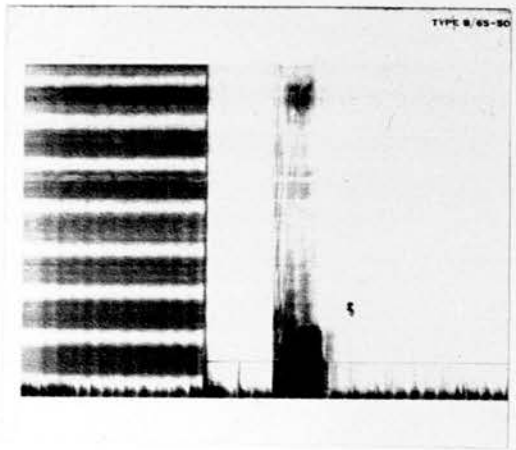
Sgm. 14 [woro] (one,a)



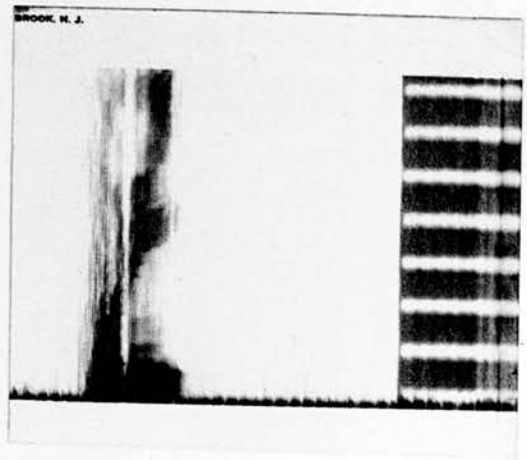
Sgm. 15 [p'ɑ:] (flower)



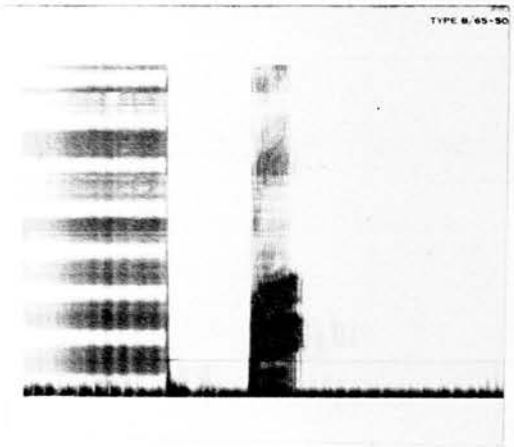
Sgm. 16 [u:ro] (town)



Sgm. 17 [po] (name of a letter)

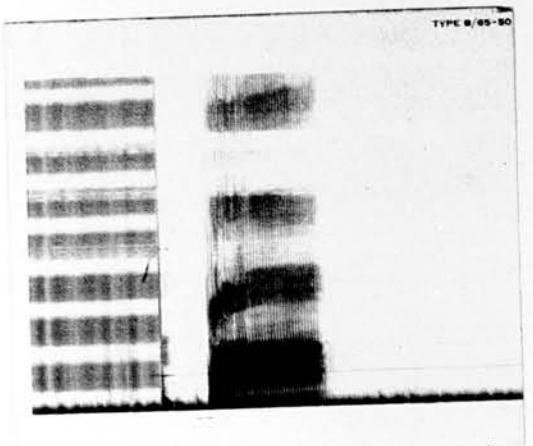


Sgm. 18 [ɑrɪ] (peel-imp.)

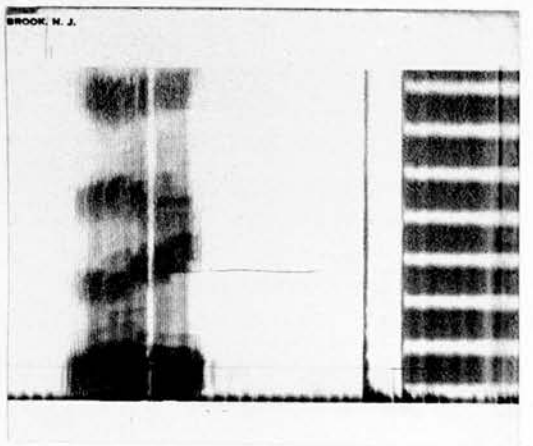


Sgm. 19 [pɑ] (name of a letter)

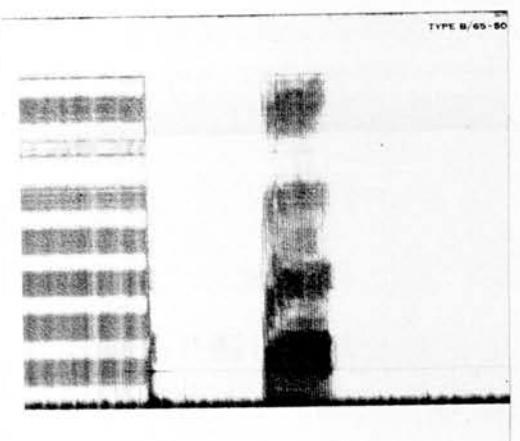
Sgm. 20 [ɑrɛ] (half)



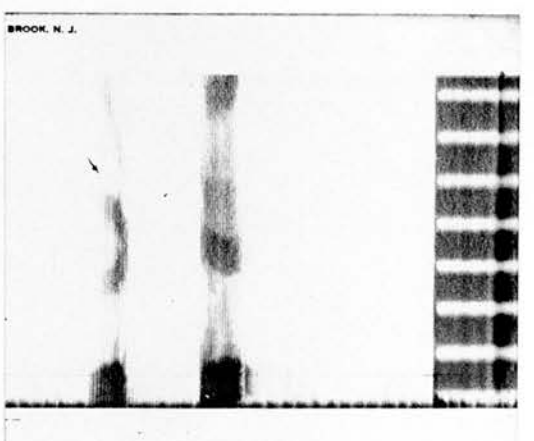
Sgm. 21 [pe:] (nonsense syllable)



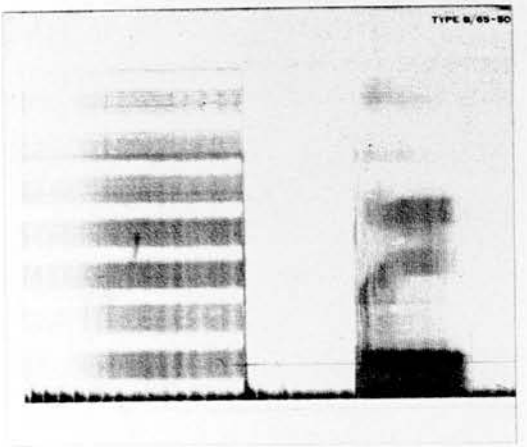
Sgm. 22 [e:ɾɨ] (climb-imp.)



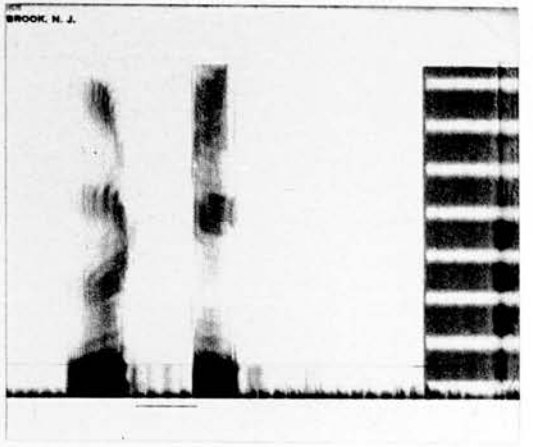
Sgm. 23 [pe] (nonsense syllable)



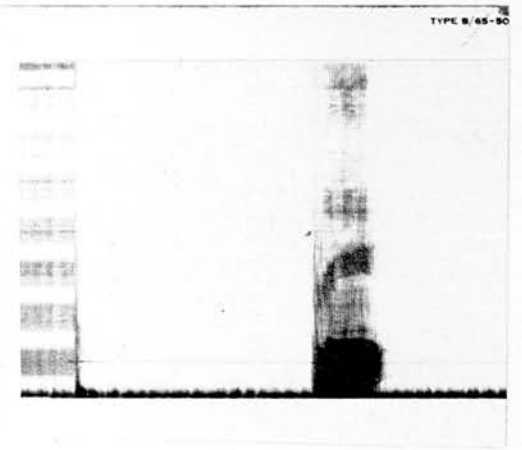
Sgm. 24 [eɪ:ɨ] (eight)



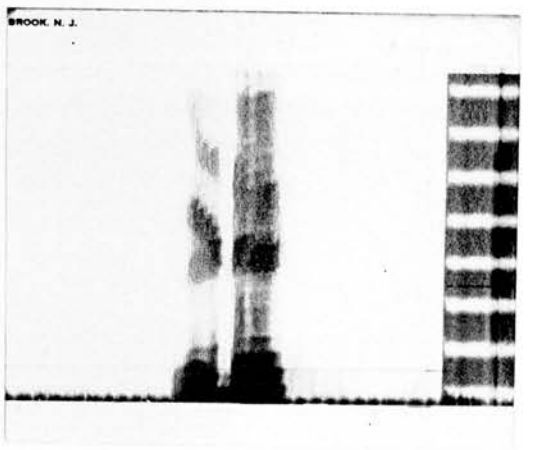
Sgm. 25 [pi:] (nonsense syllable)



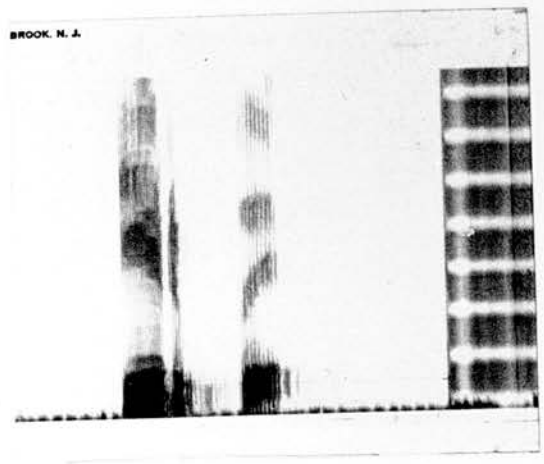
Sgm. 26 [i:ɪ·ɪ] (spear)



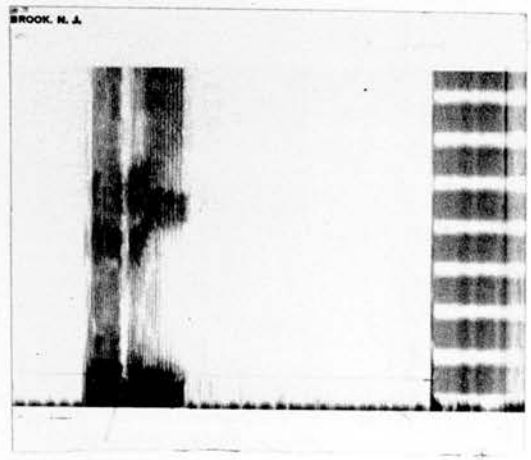
Sgm. 27 [pi] (nonsense syllable)



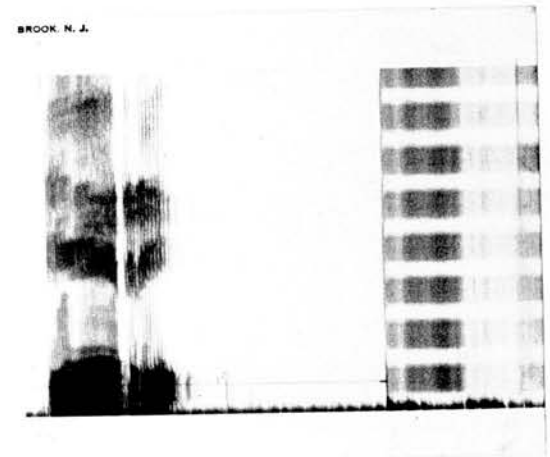
Sgm. 28 [ɨpi] (take-imp.)



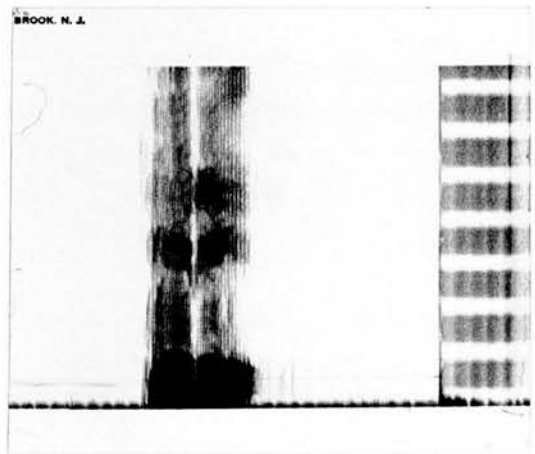
Sgm. 29 [ˈl:ɾpi] (judgement)



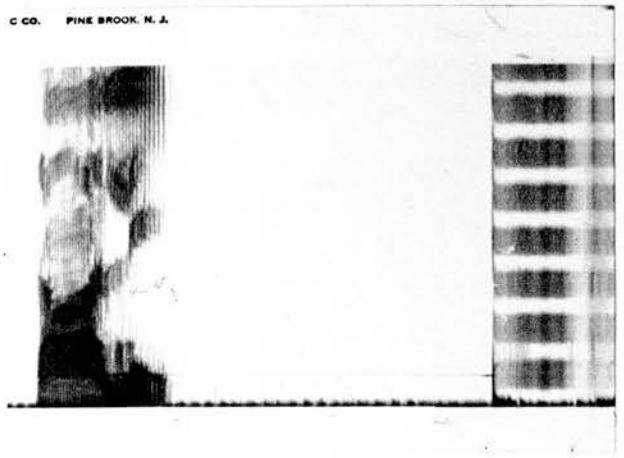
Sgm. 30 [ˈɪɾɾɪ] (wick)



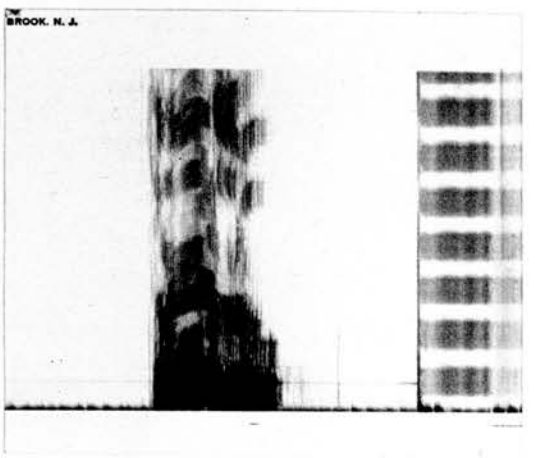
Sgm. 31. [ˈɛ:ɾɪ] (chariot)



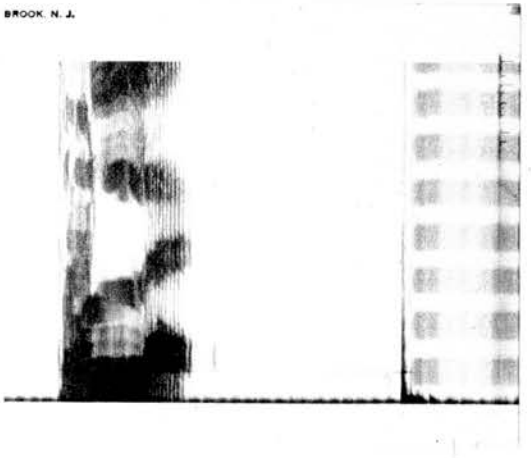
Sgm. 32 [ˈɛɾɪ] (street)



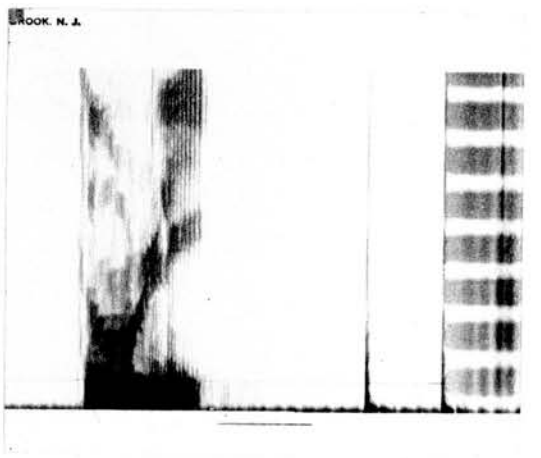
Sgm. 33 [ɟ'ɛ:lɜ] (a chain worn by a married woman)



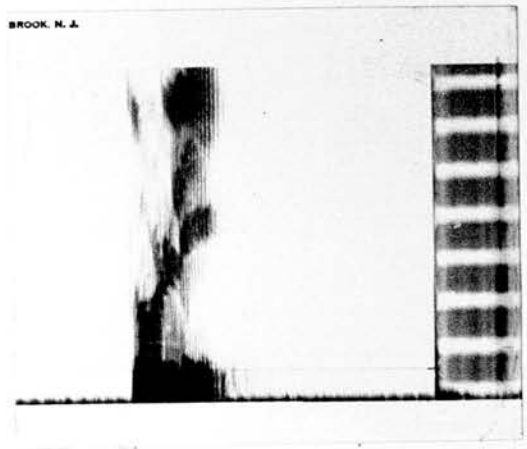
Sgm. 34 [ɟ'o:lo] (skin)



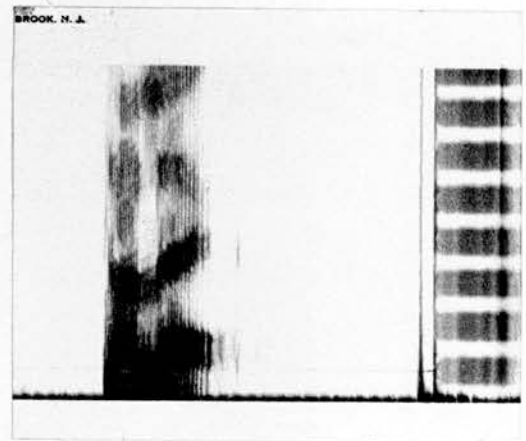
Sgm. 35 [ɟ'ol:o] (trouble)



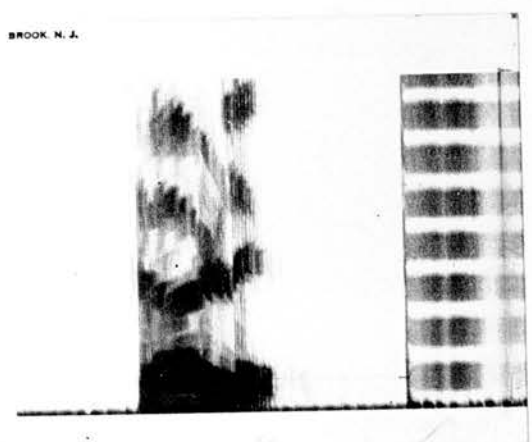
Sgm. 36 [ɟ'u:lɜ] (a cloth cradle)



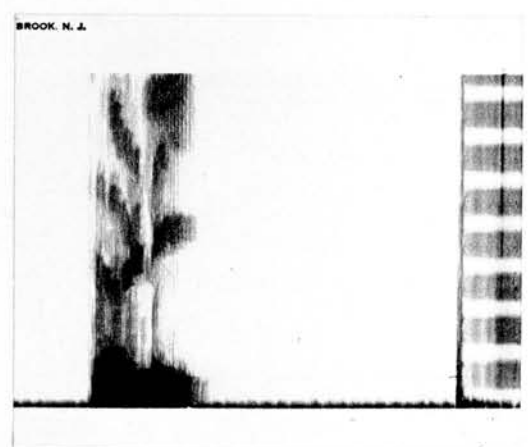
Sgm. 37 [ɻˈoɪɾ] (a drop)



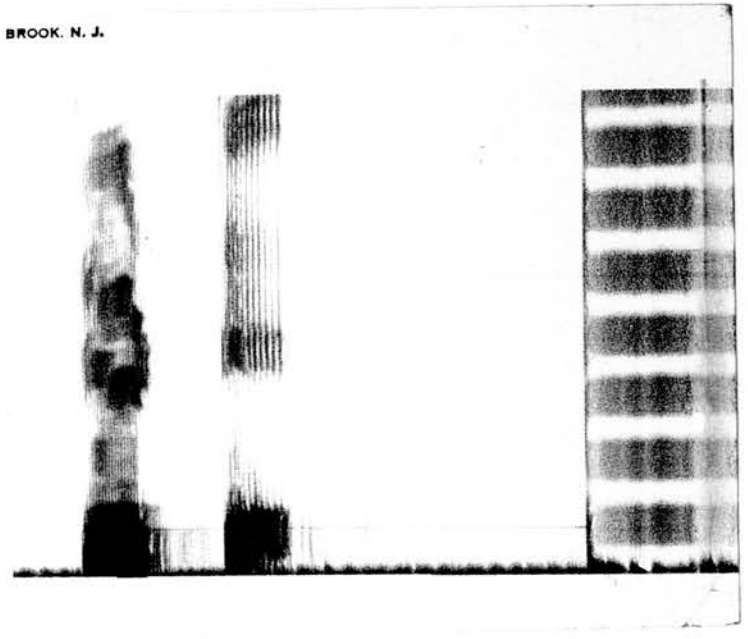
Sgm. 38 [ɻˈɑlɛ] (head)



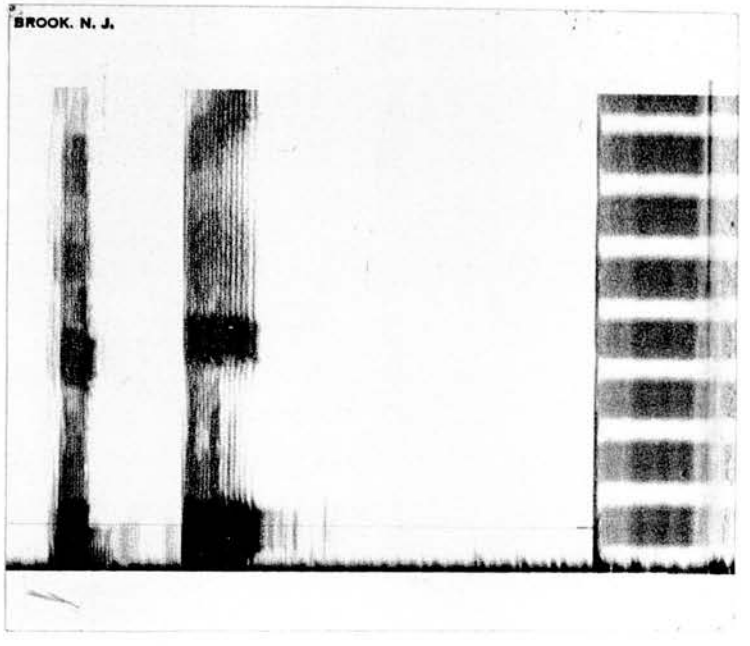
Sgm. 39 [ɻˈɑːlɬ] (scorpion)



Sgm. 40 [ɻˈoɪɾ] (sprinkle-imp.)



Sgm. 41 [ɮ'ɨ:ɽ'ɨ] (sharpen-imp.)



Sgm. 42 [ɮ'ɨɽ:ɨ] (scold-imp.)

4.1.17 Tongue-positions of the vowels under discussion:-

To ascertain the tongue positions of the vowels of the colloquial dialect of Tamil under survey and to find out the correlation between the acoustic chart of the vowels and their articulatory chart, a few X-ray photographs were taken. The same monosyllables (of the structure CV with [p] as the releasing consonant) that were used in the spectrographic analysis were used here. The monosyllables were pronounced aloud several times to make sure that the correct vowel sound in each case was being articulated. Then each syllable was pronounced aloud, the vowel position held and an X-ray taken. The syllables were tape-recorded during the process. They were listened to later to make sure again that the correct vowels had been articulated during the process. The X-rays were then studied. Tracings of the X-ray pictures are reproduced on the next few pages. Figures 6 to 15 are tracings of the vocal organs during the articulation of single vowel sounds and Figure 16 shows the tongue-positions of nine vowels [10] in one figure. To draw this, the front upper tooth and the hard palate were chosen as reference points. It should be pointed out

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10. Only 10 out of the 14 vowels were analysed with the help of X-rays. Nine out of these ten are included in Figure 16.

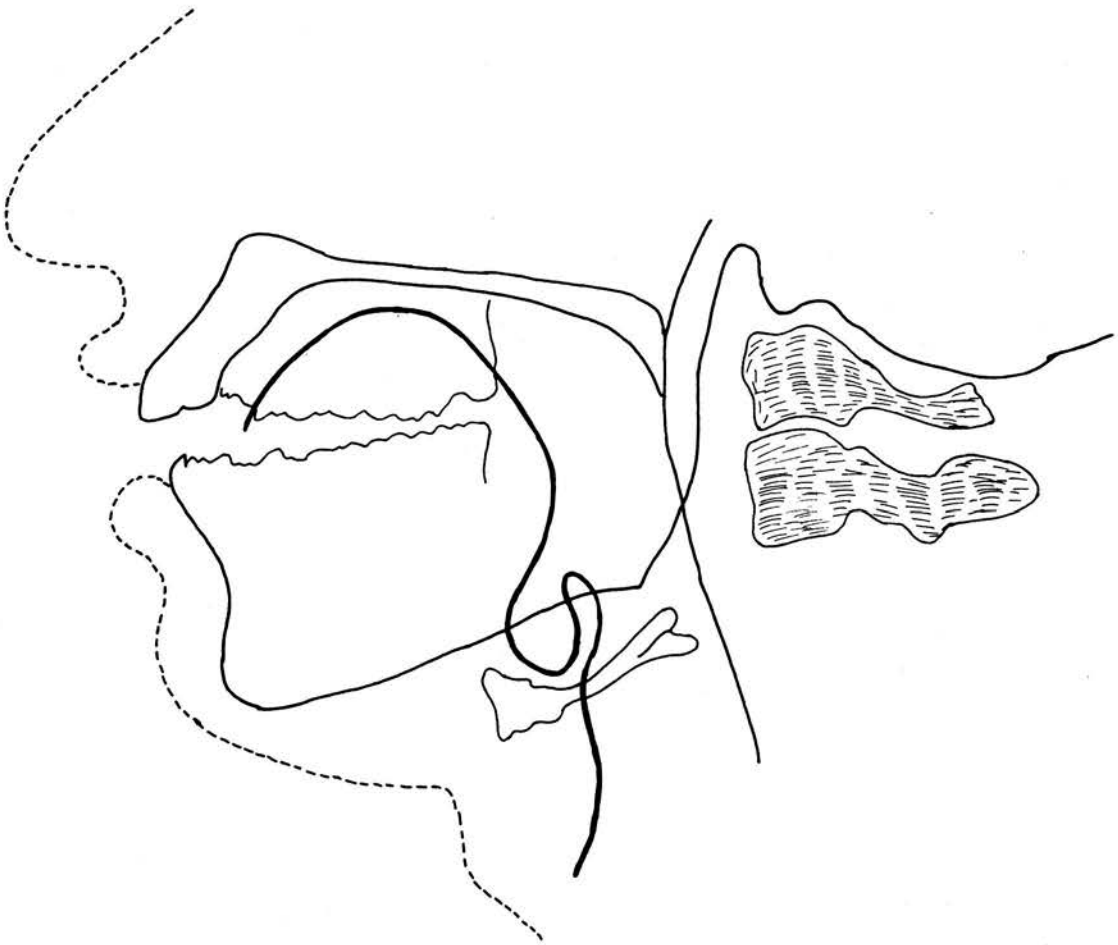


Figure 6 Tongue position of [i:]

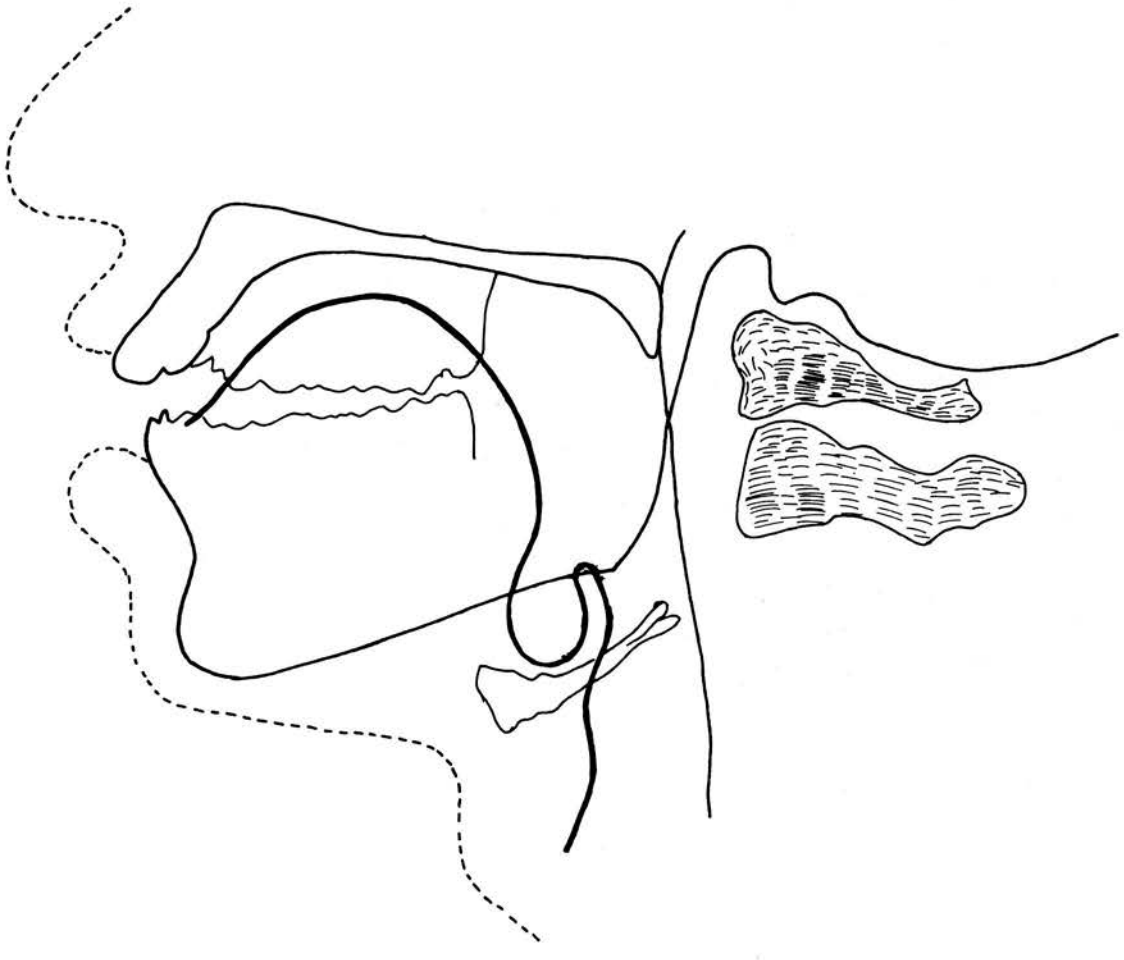


Figure 7 Tongue position of [ɪ]

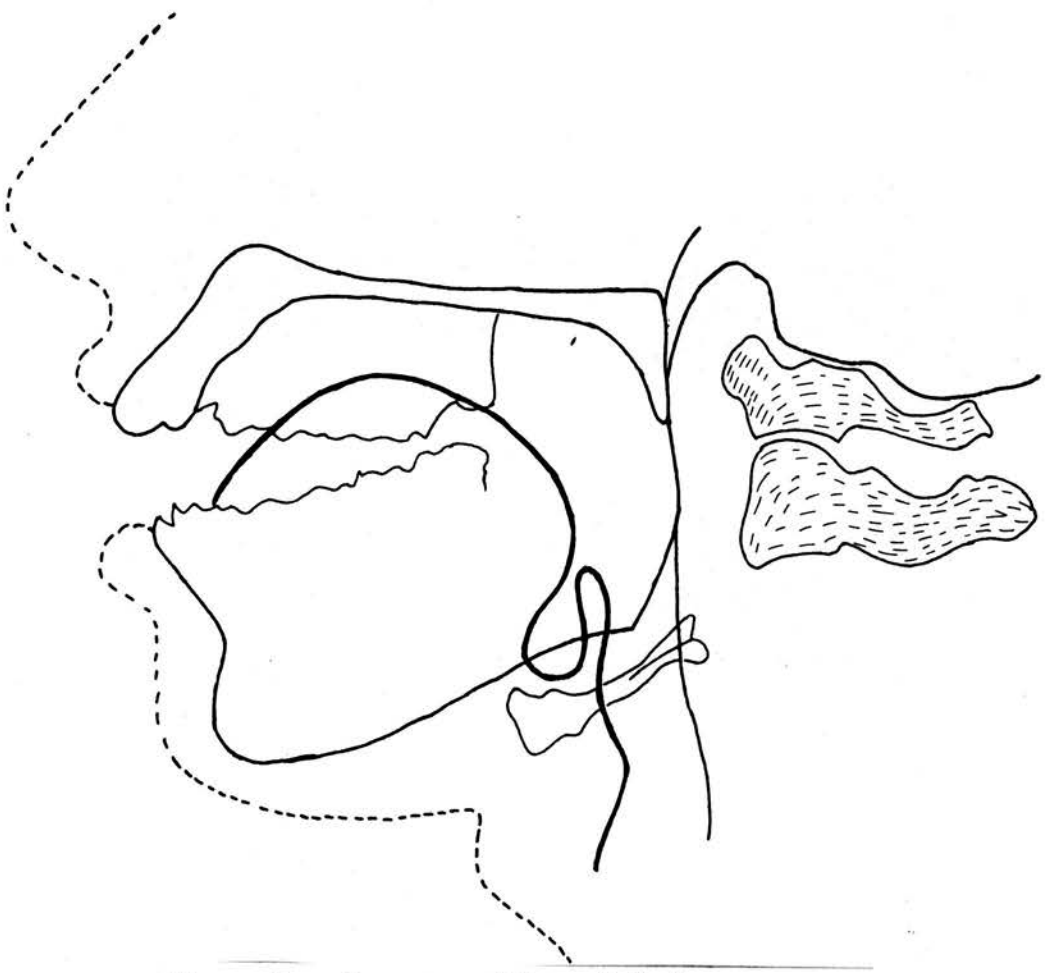


Figure 8 Tongue position of [e:]

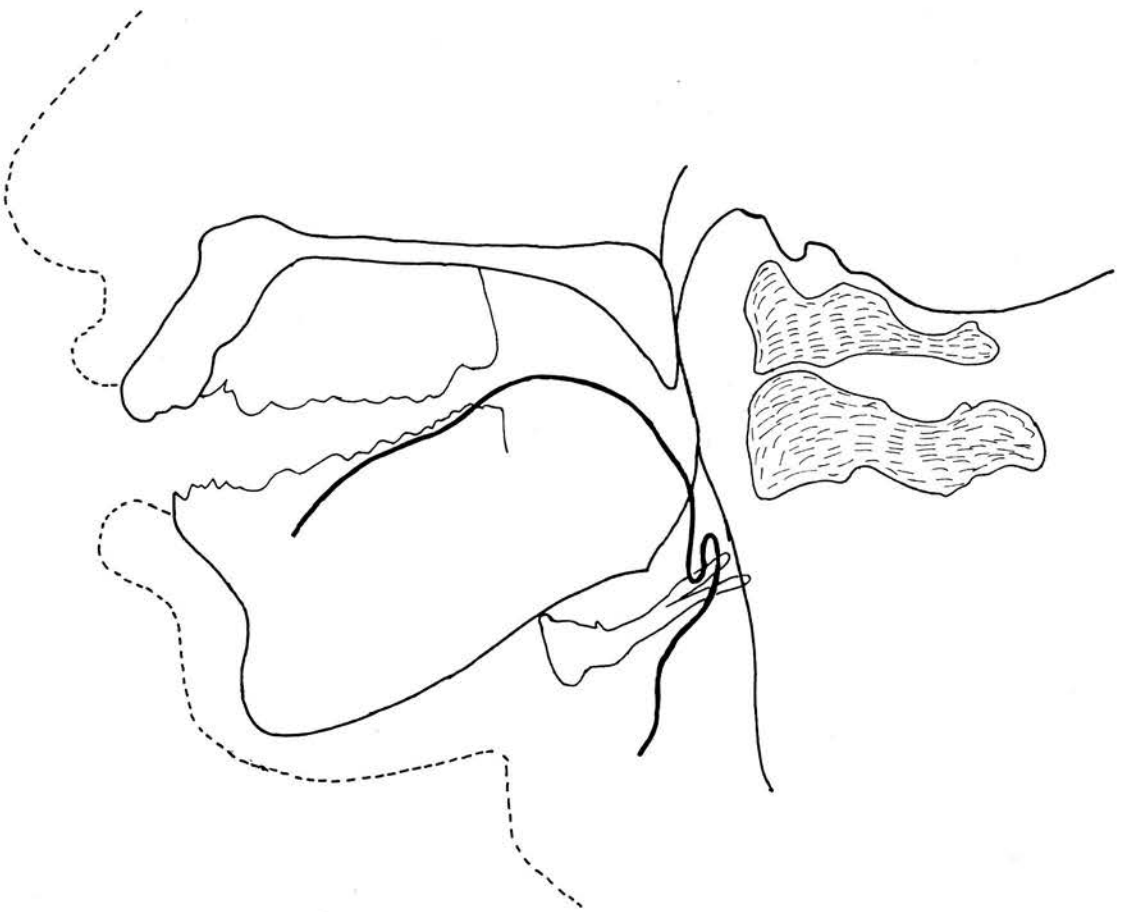


Figure 9 Tongue position of [a:]

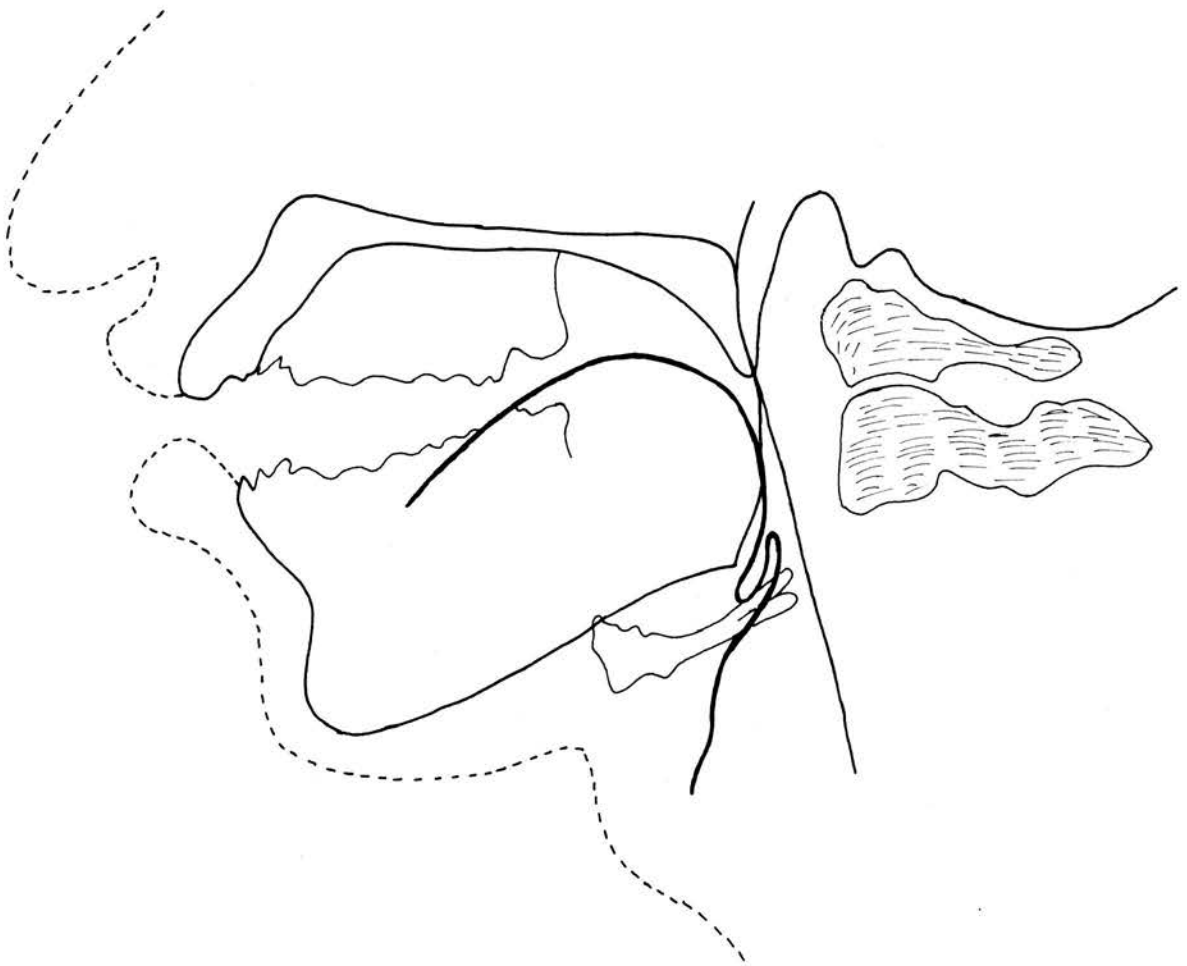


Figure 10 Tongue position of [o:]

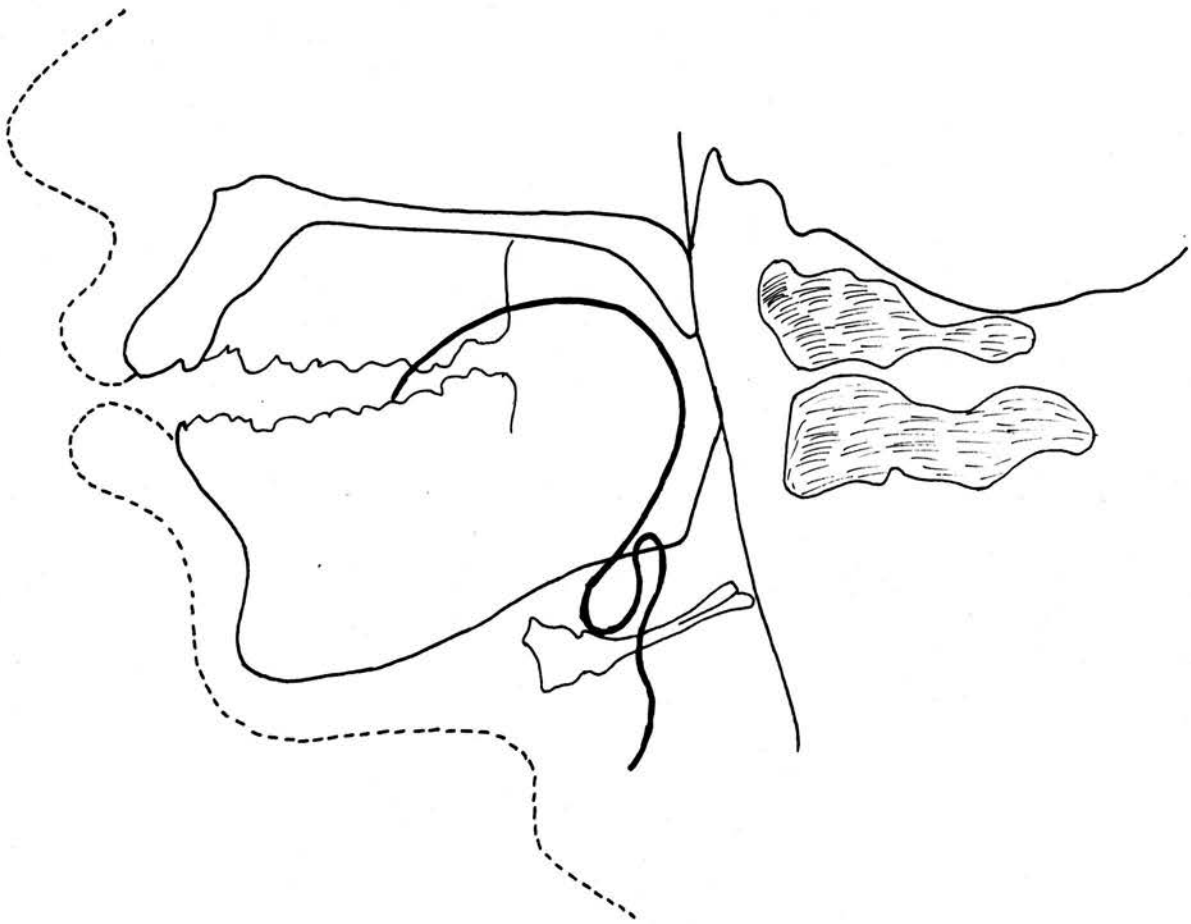


Figure 11 Tongue position of [u:]

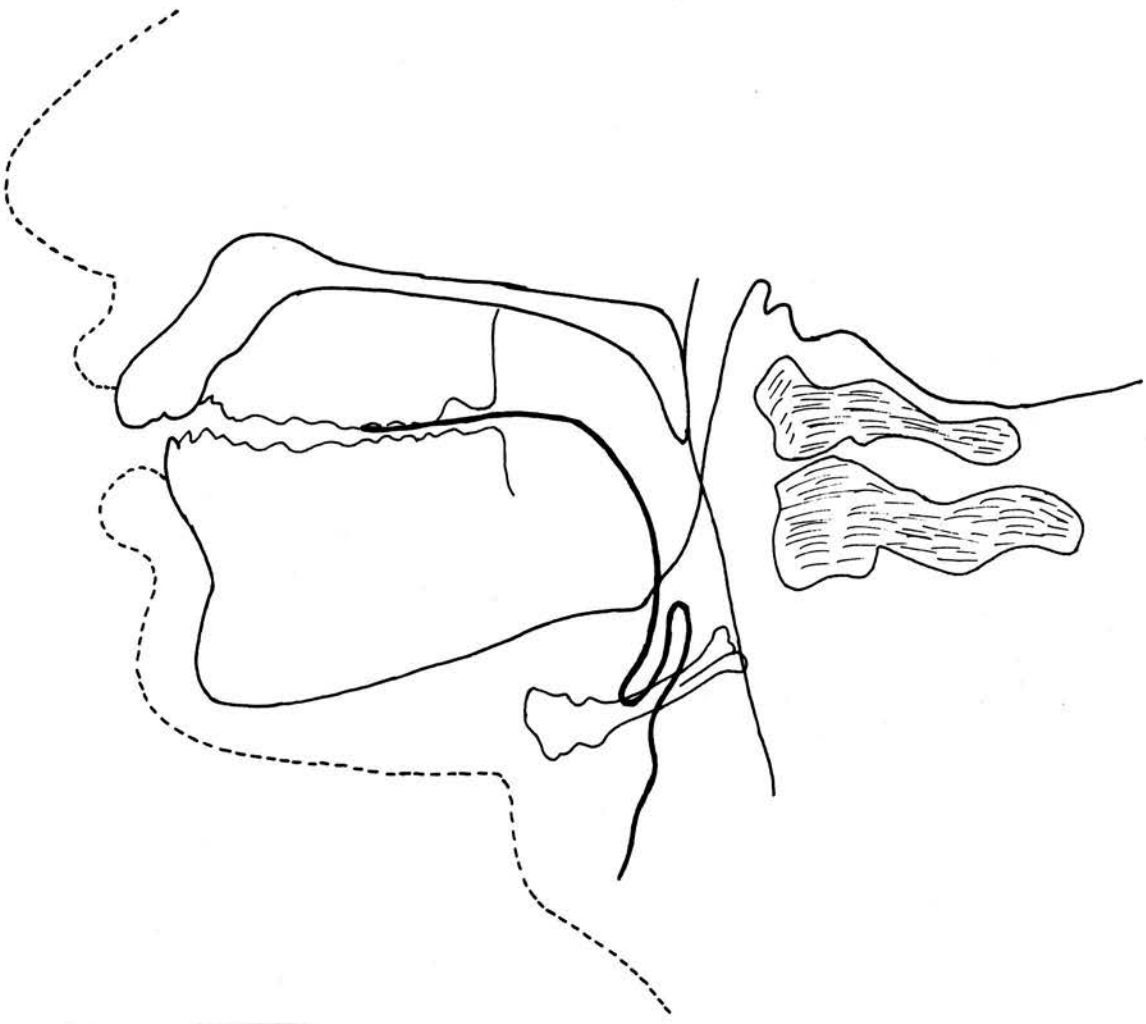


Figure 12 Tongue position of [ə:]

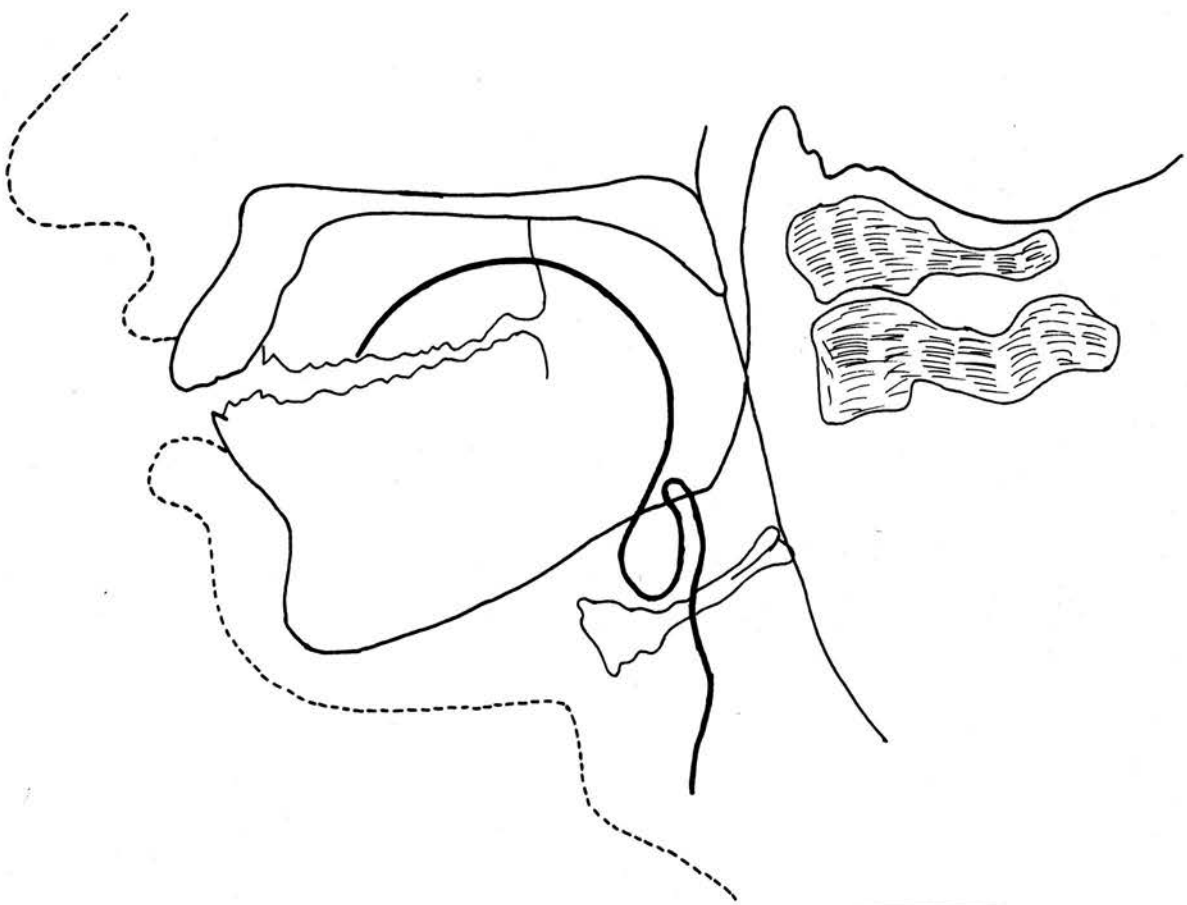


Figure 13 Tongue position of [i:]

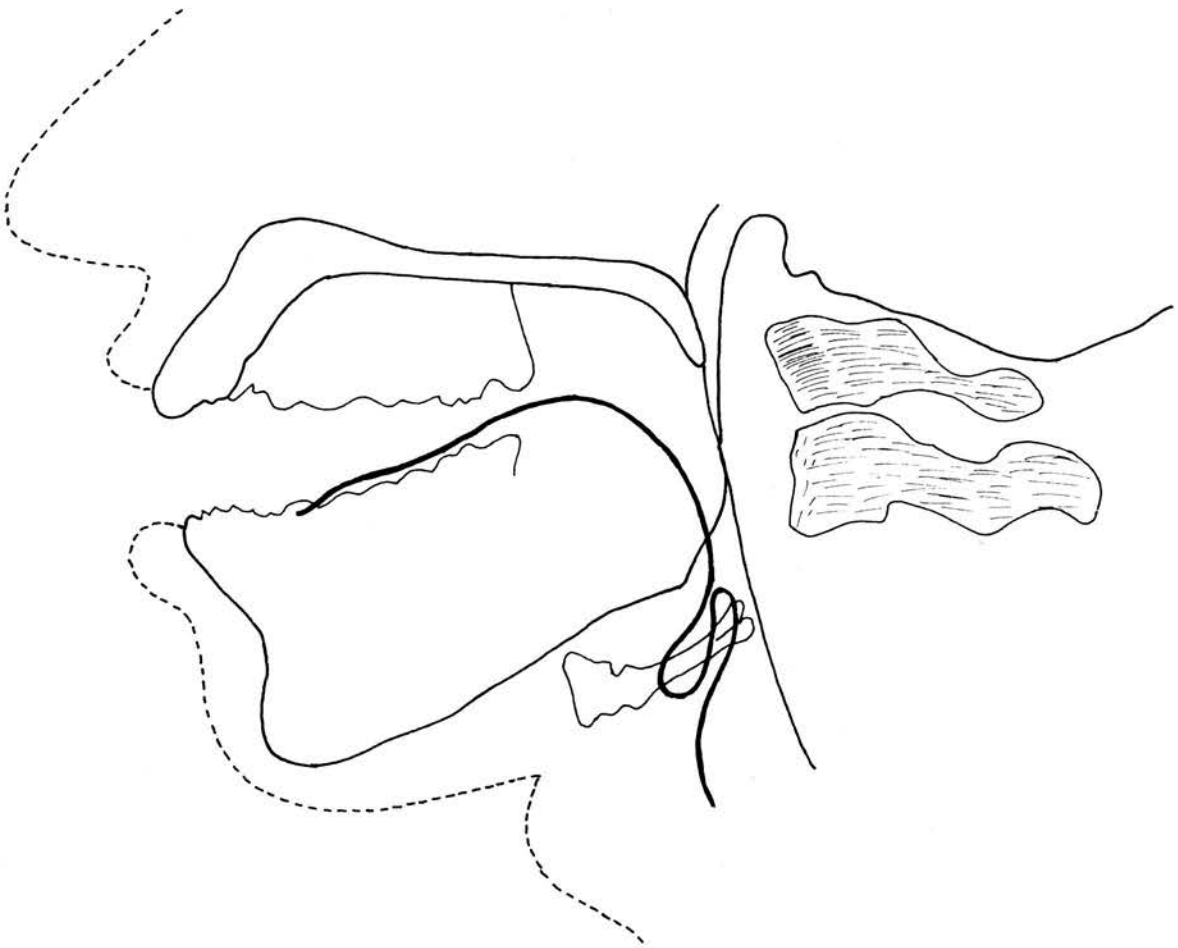


Figure 14 Tongue position of [a]

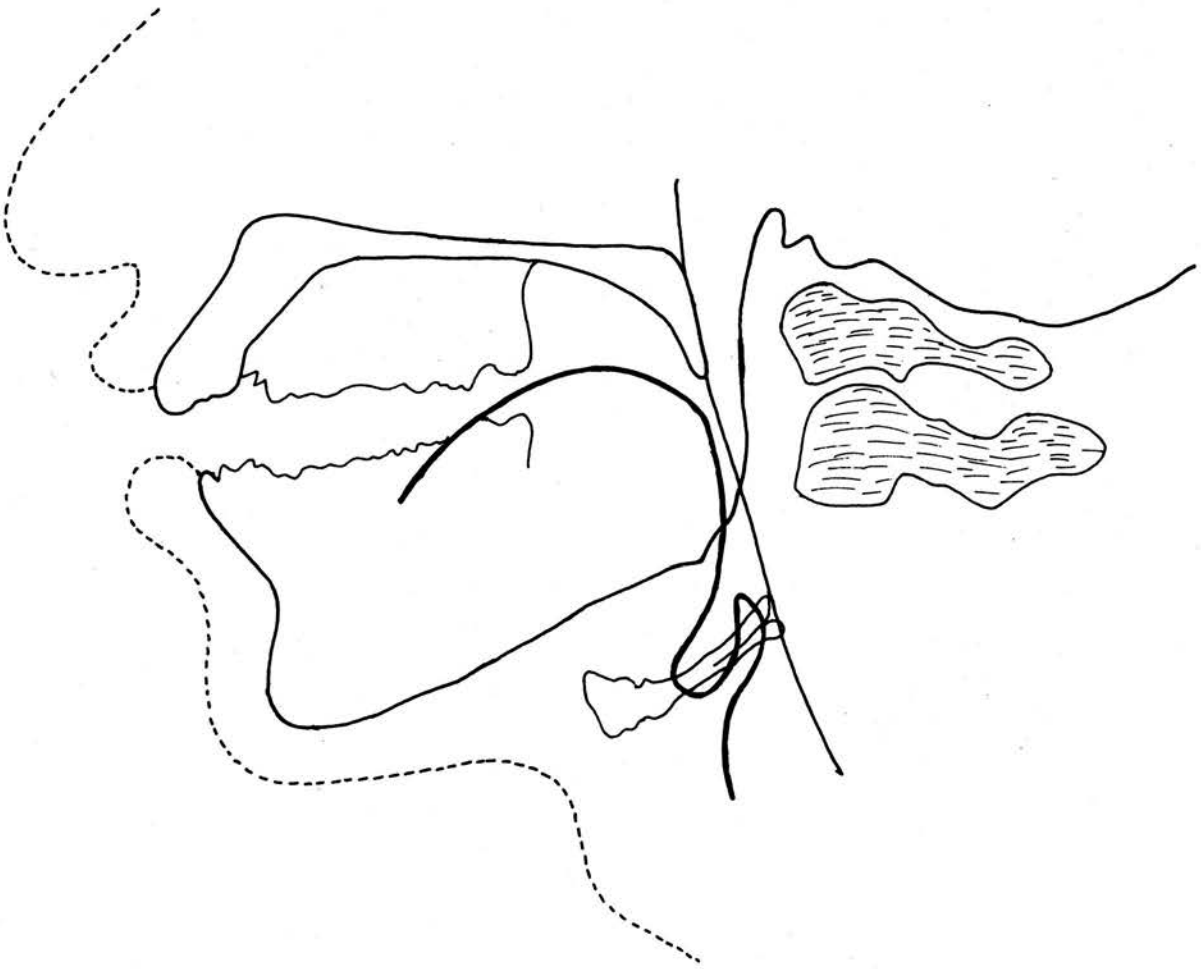


Figure 15 Tongue position of [ɷ]

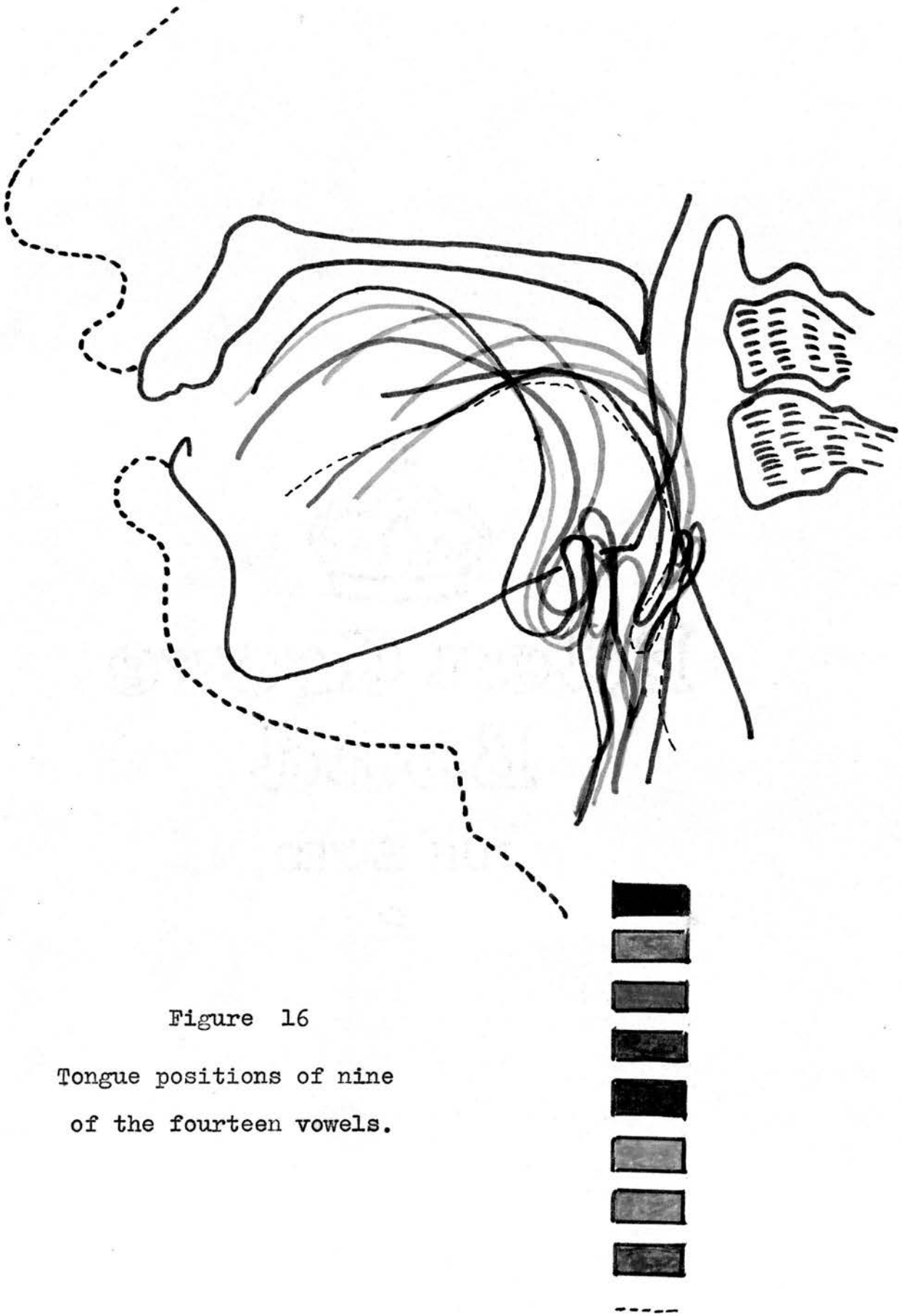


Figure 16

Tongue positions of nine
of the fourteen vowels.

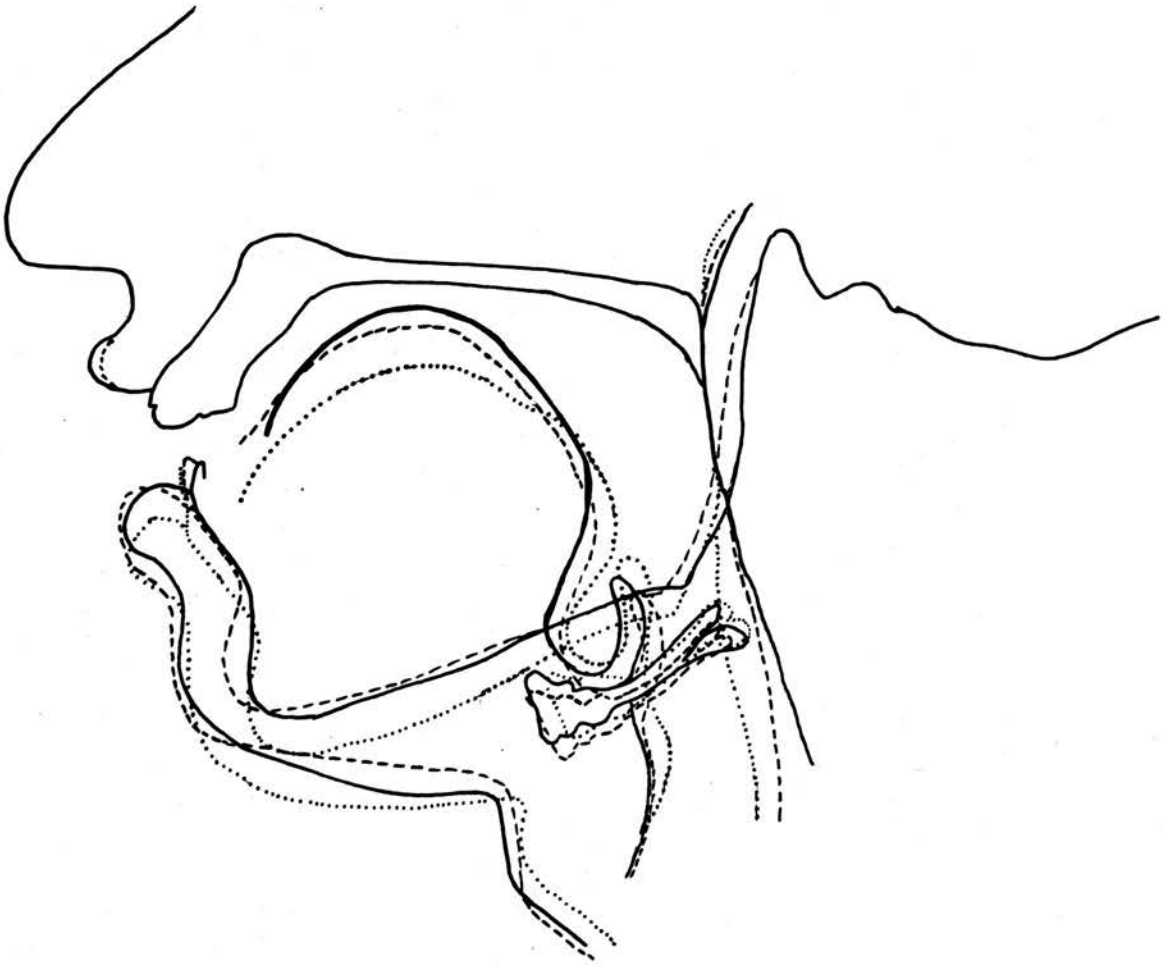


FIGURE 17
Tongue, lip and jaw positions of i:, ɪ and e:

——— i:
- - - - ɪ
..... e:

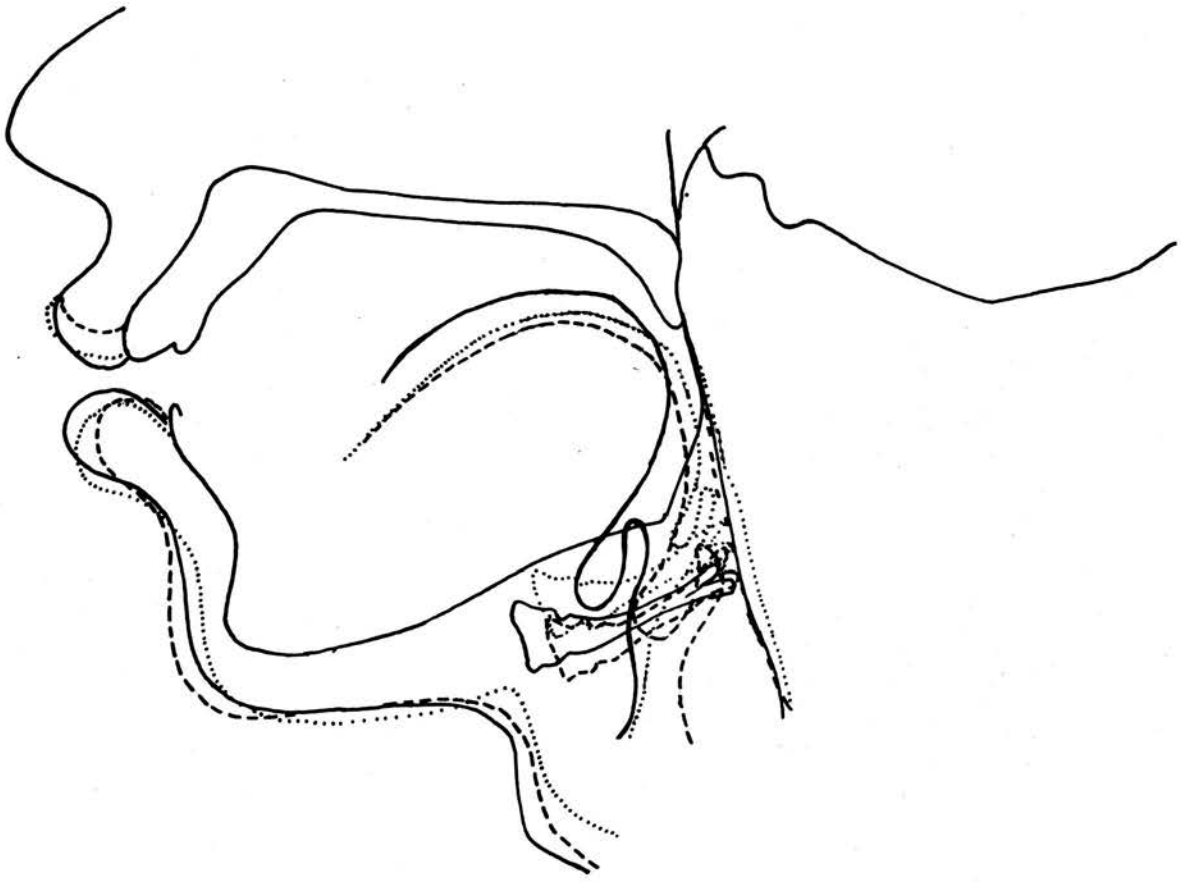


FIGURE 17A
Tongue, lip and jaw positions of u:, ɑ and o:

——— u:
- - - - ɑ
..... o:

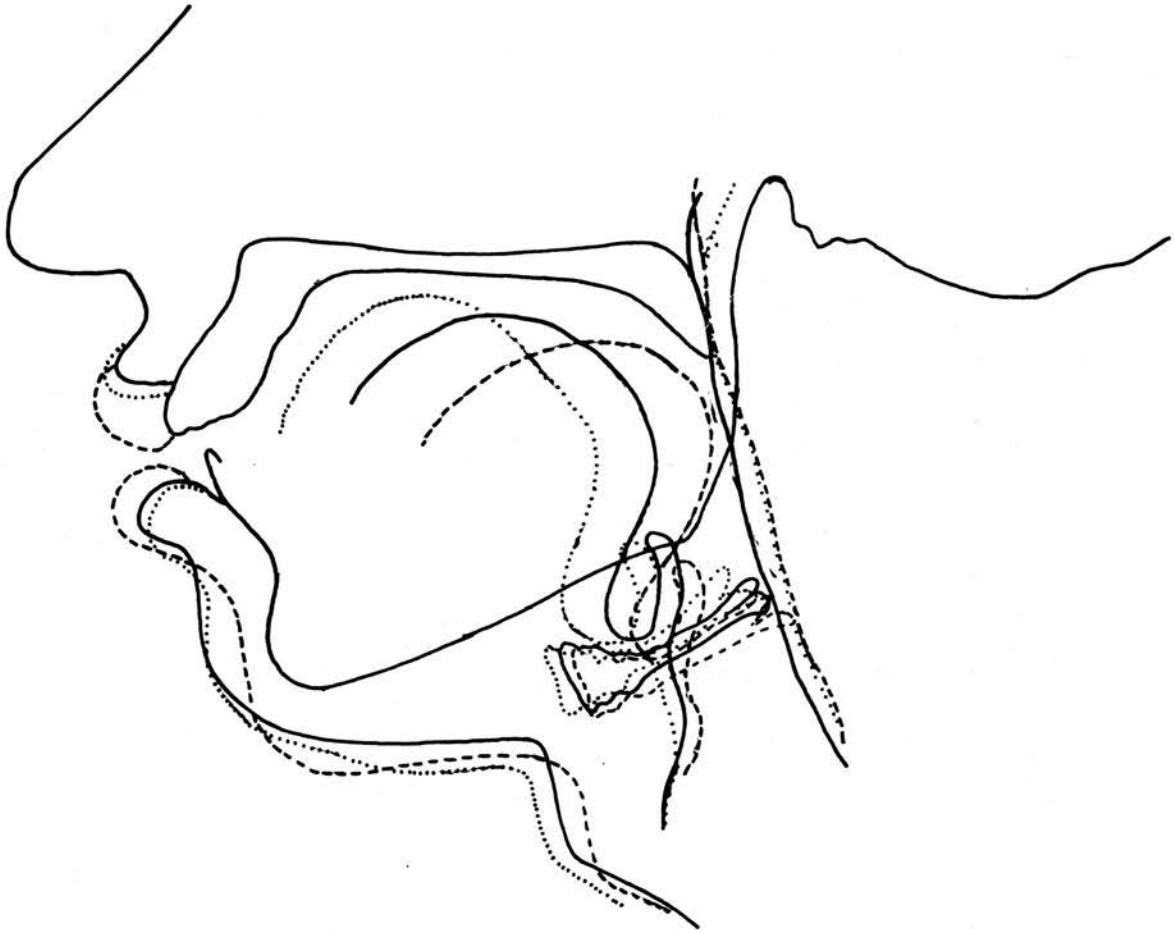


FIGURE 17B
Tongue, lip and jaw positions of ɨ:, u: and i:

——— ɨ:
– – – – u:
. . . . . i:

FIGURE 17C
Tongue, lip and jaw positions of **a:**, **a** and u:

——— **a:**
- - - - **a**
..... **u:**

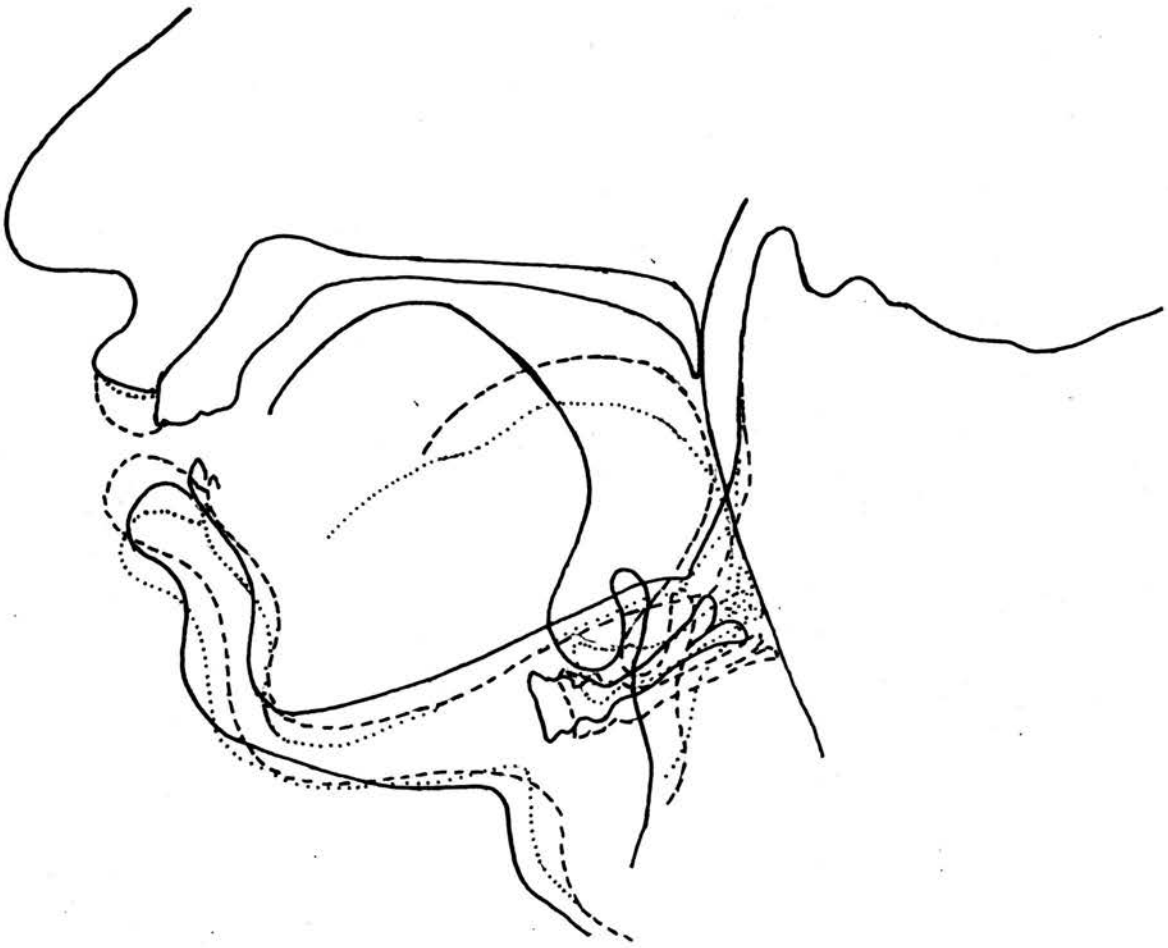


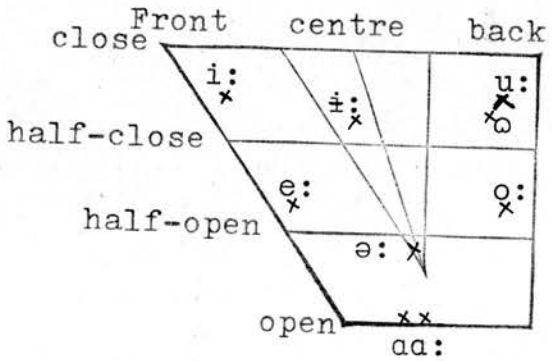
FIGURE 18
Tongue, lip and jaw positions of i:, u: and ɑ:

——— i:
– – – – u:
. . . . . ɑ:

here that there is some artificiality about marking the tongue positions of several vowels in one diagram. The lip and jaw positions, for example, have been left out in the diagram. Five other diagrams are reproduced after this, with the lip, jaw and tongue positions of three vowels in each diagram.

4.1.18 From the tracings of the X-ray photographs reproduced on the preceding pages we find that in articulating the vowels [i:], [ɪ] and [e:] the 'front' of the tongue is highest, the height of the tongue being very near close, very near half-close and between half-close and half-open respectively; in articulating [ɑ:] and [ɑ] that part of the tongue which is slightly in advance of the 'back' of the tongue is highest, the height of the tongue being fully open in both cases; in articulating [o:], [u:] and [ʊ] the 'back' of the tongue is highest, the height of the tongue being between half-close and half-open, very near close and between half-close and close respectively; in articulating [ə:] the 'centre' of the tongue is highest, the height of the tongue being between close and open, but nearer close than open; and in articulating [ɨ:] the 'centre' of the tongue is the highest, the height of the tongue being between close and half-close.

4.1.19 Taking into account the tongue-positions of these vowels, we can plot these in the Cardinal Vowel chart:



4.1.20 Comparing this with the acoustic graphs reproduced earlier (see figures 1-5) we see that there is a correlation between vowel qualities arrived at on the basis of the acoustic properties of vowels and those arrived at on the basis of their articulation.

4.1.21 <u>Positions of the sides of the tongue</u>:-

From X-ray photographs it is possible to ascertain what position the main body of the tongue assumes during the articulation of vowels. In other words, we can find out whether the 'front', the 'centre' or the 'back' of the tongue is highest in the mouth when any particular vowel sound is articulated. In order to ascertain what position the sides of the tongue assume when vowel sounds are articulated, palatograms were made. The same monosyllables that were used for an acoustic and

articulatory analysis of the vowels were used for this palatographic study. It was found that the vowels [i:], [ɪ], [e:], [ɛ], [ɨ:] and [ɨ] give palatograms, while the vowels [ɑ:], [ɑ], [o:], [o] [u:], [ʊ], [ə:] and [ə] do not. This indicates that in articulating [i:], [ɪ], [e:], [ɛ], [ɨ:] and [ɨ] the sides of the tongue touch the sides of the roof of the mouth. These palatograms are reproduced below.

These palatograms reveal that the front vowels and central vowels in the close half-open area give palatograms, whereas all the back vowels and the central vowels in the half-open open area do not give palatograms. The palatograms of the front vowels and those of the central vowels [ɨ:] and [ɨ] also show that the wipe-off caused by the sides of the tongue is not uniform on both sides. There is more wipe-off on the photographic right than on the photographic left. This phenomenon is discussed in chapter III. (see 3.2.13).

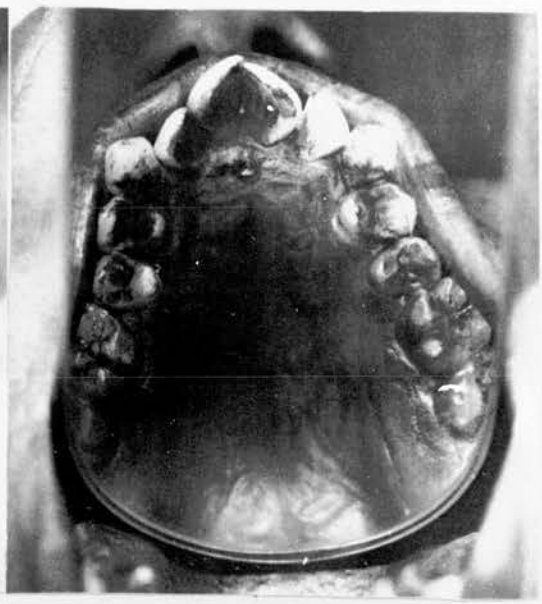
Pgm. 3
[pi:] (excreta)

Pgm. 4
[pɪ] (name of a letter)

Pgm. 5
[pe:] (name of a letter)

Pgm. 6
[pɛ] (name of a letter)

Pgm. 7
[pa:] (name of a letter)

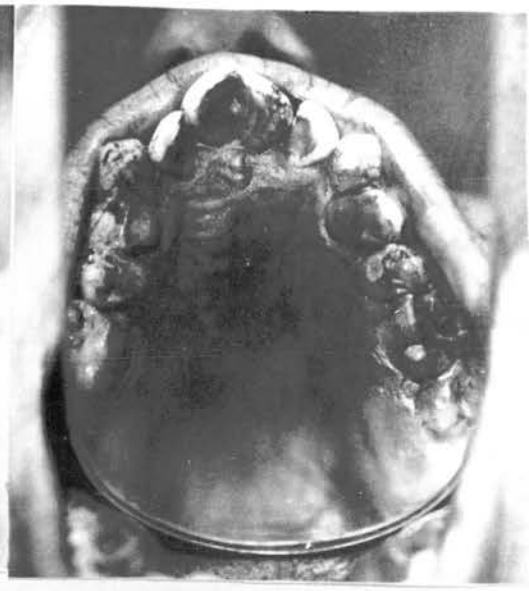


Pgm. 8
[pa] (name of a letter)

Pgm. 9
[po:] (go - imp.)

Pgm. 10
[po] (name of a letter)

Pgm. 11
[pu:] (flower)



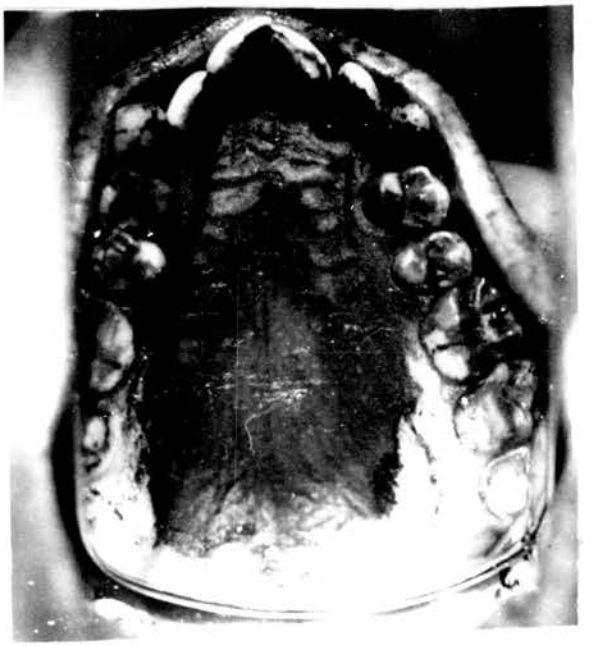
Pgm. 12
[pɷ] (name of a letter)

Pgm. 13
[pə:] (nonsense syllable)

Pgm. 14
[pə] (nonsense syllable)

Pgm. 15

[pɨ:] (nonsense syllable)



Pgm. 16

[pɨ] (nonsense syllable)

4.1.22 The palatogram of the word [p'i:] (excreta) - palatogram 3 - shows a side wipe-off from the third molar extending up to the first pre-molar tooth. Palatogram 4 - that of [ɒɪ] - also shows a side wipe-off extending from the third molar to the first pre-molar, but in the region of the first and second molars, there is more wipe-off in palatogram 3 than in palatogram 4. In other words, the air-channel for [i:] is narrower than for [ɪ]. Palatograms 5 and 6 - those of [e:] and [ɛ] - show a wipe-off narrower than in the previous two palatograms. Also, the wipe-off in these two palatograms extends from the third molar to the first molar. Then there is a suggestion of a wipe-off in the region of the two pre-molars. The sides of the tongue seem to have removed a bit of the marking medium from the two pre-molar teeth, leaving the marking medium on the sides of the post-alveolar region untouched. Again, the air-channel for [e:] is a fraction more than for [ɛ]. Comparing all these four palatograms we see that the air-channel is widest for [ɛ], less wide for [e:], still less wide for [ɪ] and narrowest for [i:]. Palatograms 15 and 16 - those of [ɨ:] and [ɨ] - show almost identical wipe-offs, extending from the third molar to the bottom edge of the first molar. Palatograms 7 - 14 - those of [ɑ:], [ɑ], [o:], [o], [u:], [ʊ]. [ə:] and [ə] respectively -

show no wipe-off whatever. It is clear thus that while articulating the front vowels and the central vowels [ɨ:] and [ɨ] the sides of the tongue touch the sides of the palate and the side-teeth, whereas while articulating the back vowels and the central vowels [ə:] and [ə] the sides of the tongue do not touch the sides of the palate or the side-teeth.

4.1.23 Lip and jaw positions:-

To study the lip and jaw positions during the articulation of the vowels, one hundred feet of cine-photography was taken. The same monosyllables used in the previous three analyses were used in this study. In addition, three sets of words were chosen with the vowels under investigation in various phonetic environments. To check consistency (or lack of it) in the position of the lips and jaws during the articulation of the same vowels, one set of fourteen words was said twice. To avoid confusion during the analysis of these films - confusion regarding where one word ended and the next one began - the utterances were taped when the filming was done. In addition, after uttering every word, the index finger was placed on the lips. The film was then studied frame by frame with the help of a film-analyser and the following measurements were taken:-

(a) width of lip opening

(b) height of lip opening

(c) distance between the upper tip of the upper lip and the lower tip of the lower lip

(d) protrusion of the upper lip

(e) distance between the jaws

4.1.24 While taking the film [11] a mirror was placed near the investigator's (the present writer himself) face and thus on every frame a frontal view of the face and the profile could be seen.

4.1.25 To measure the protrusion of the upper lip, a perpendicular was drawn on the film analyser screen from the point where the nose ends and the upper lip begins. When the vocal organs were at rest (i.e., when the present writer sat with his lips closed) the line drawn just touched the upper lip. During the articulation of certain vowels, the upper lip was seen to lie beyond this line and this was measured to find the protrusion of the upper lip.

11. The film was made in the Department of Animal Genetics, King's Buildings, University of Edinburgh. The speed of the film was 24 frames per second.

4.1.26 To measure the distance between the jaws, a line joining a mark (birthmark) on the right chin and the tip of the nose was drawn on a sheet of paper placed permanently on the film analyser screen.

4.1.27 The measurements detailed above were taken of every frame from the beginning of a word to the end of it. It was found that the measurements were the same in five or six frames and these measurements were taken as those specific to the articulation of the vowel in question.

4.1.28 The measurements of three sets of words/monosyllables are tabulated in Appendix II. The measurements were taken from the film analyser. It was found that the ratio between the projected size of the writer's face and its life-size was 105:140 (= 3:4). Appendix II contains the measurements of the projected size of the face. The lip and jaw measurements during the articulations of the vowels alone are given below - i.e., those measurements that were found consistent in a few frames. The following are the measurements converted into life-size.

Table 6:-

Lip and jaw position of vowels:-

vowel	Width of lip-opening. (m.m)						height of lip-opening. (m.m)						distance between the upper tip of upper lip and lower tip of lower lip. (m.m)						Protrusion of the upper lip. (m.m)						distance between the jaws. (m.m)					
	sample 1	sample 2	sample 3	sample 4	average		sample 1	sample 2	sample 3	sample 4	average		sample 1	sample 2	sample 3	sample 4	average		sample 1	sample 2	sample 3	sample 4	average		sample 1	sample 2	sample 3	sample 4	average	
i:	41	40	40	41	41		11	12	12	12	12		32	32	31	32	32		-	-	-	-	-		56	56	55	56	56	
ɪ	40	40	39	40	40		15	13	12	13	13		35	32	32	33	33		-	-	-	-	-		57	57	56	57	56	
e:	48	45	45	47	47		21	19	17	19	19		40	39	39	40	40		-	-	-	-	-		63	60	59	60	60	
ɛ	47	44	44	45	45		19	19	17	19	19		39	37	37	39	39		-	-	-	-	-		63	63	61	61	61	
a:	40	40	40	40	40		21	21	20	21	21		45	45	43	45	44		-	-	-	-	-		67	65	65	65	65	
o:	15	15	16	15	15		11	9	9	9	10		37	37	36	37	37		4	4	4	4	4		67	64	64	65	65	
o	24	21	23	21	23		12	9	11	9	11		36	35	35	35	35		3	3	3	3	3		61	60	63	61	61	
u:	8	7	8	7	8		7	7	7	7	7		31	29	29	31	31		5	5	6	5	5		55	55	56	55	55	
ɑ	11	8	9	9	9		8	8	8	8	8		29	28	29	29	29		5	5	5	5	5		56	57	56	56	56	
ɑ	37	39	39	39	39		25	25	24	25	25		45	43	44	44	44		-	-	-	-	-		65	64	65	65	65	
ə:	43	40	40	41	41		16	15	15	16	16		35	33	33	35	35		-	-	-	-	-		57	56	53	56	56	
ə	41	40	40	40	40		16	15	13	15	15		35	35	36	35	35		-	-	-	-	-		56	56	56	56	56	
ɜ:	41	39	40	40	40		15	12	13	13	13		32	29	31	31	31		-	-	-	-	-		53	56	53	55	54	
ɜ	40	39	39	40	40		13	13	12	13	13		29	29	29	29	29		-	-	-	-	-		53	53	54	53	54	

4.1.29 To check the consistency in lip-spreading, lip-rounding, lip-protrusion and in the distance between the jaws during the different articulations of the same vowels, these four readings were plotted on graph sheets. Graph I shows the width of lip opening in the four samples studied. There are four lines - a straight line, a dashed line, a dotted line and a wavy line - and each line joins width-of-lip-opening-reading during one articulation. The graph shows that there are some inconsistencies in the width of lip opening during the articulation of [e:], [ɛ], [o], [ɷ] and [ə:] - the difference between the lowest reading and the highest one being 3 m.m. in each case - whereas the width of lip opening during the articulation of other vowels is more or less consistent - the difference between the lowest reading and the highest reading is 1 m.m. in most cases and 2 m.m. in the case of [ɑ] and [i:].

4.1.30 Graph II shows the height of lip opening in the four samples studied. Inconsistencies similar to the ones seen above are seen here, too. [ɪ], [e:], [o] and [ə] show maximum inconsistencies. Graph III shows the distance between the jaws in the four samples studied. Here again we see maximum inconsistencies in the readings for [e:], [o:], [o] and [ə:] Graph IV shows the protrusion of the upper lip in the four samples studied. There is hardly any inconsistency here, the only case of

inconsistency being a difference of 1 m.m. in the reading for [u:].

4.1.31 Graph V shows the relation between the area of mouth opening (i.e., width of lip opening x height of lip opening) and the protrusion of the upper lip in the case of back rounded vowels. From this graph we find that the protrusion of the upper lip increases with any considerable decrease in the area of mouth opening. It will be noted that the lip-protrusion of [u:] and [ɷ] is the same though the area of mouth opening for [u:] is smaller than for [ɷ], but this difference in the area of mouth opening is not considerable - 56 $m.m^2$ in the case of [u:] and 72 $m.m^2$ in the case of [ɷ].

4.1.32 From the tabulated results we see that:-

(a) In the case of back rounded vowels, the protrusion of the upper lip increases with any considerable decrease in the area of mouth opening.

(b) In the case of back rounded vowels the width of lip opening increases with any considerable increase in the height of lip opening.

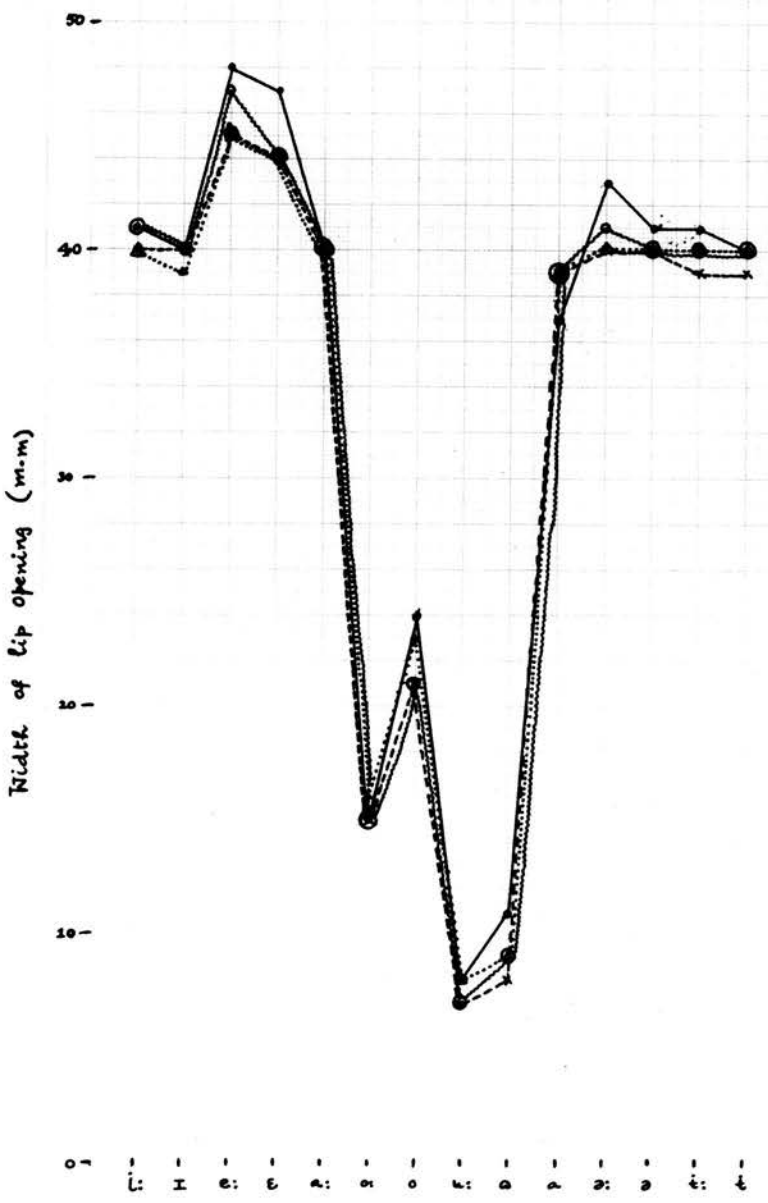
(c) In the case of front vowels, central vowels and back unrounded vowels, the height of lip opening and the width of lip opening seem independent of each other.

(d) Open vowels in general have more lip opening than close vowels.

The five graphs are reproduced below. Also reproduced are tracings of a few of the frames of cinefilms and labiograms of the vowels under investigation.

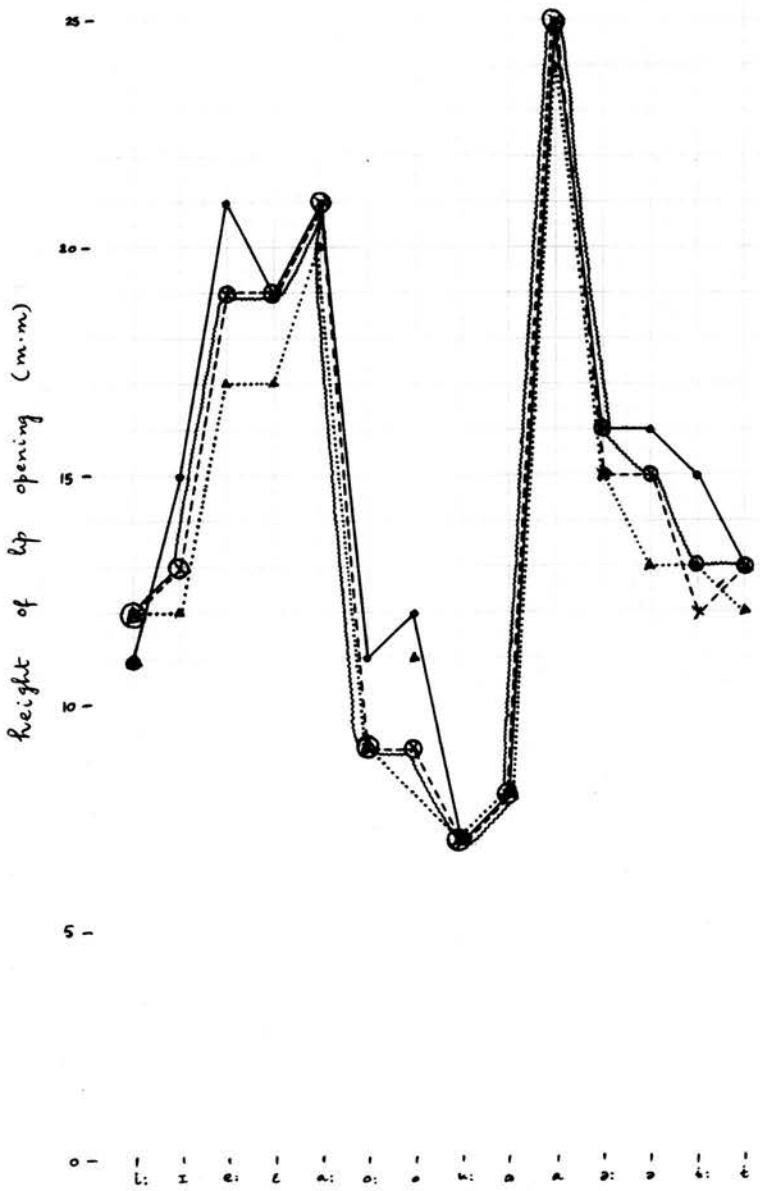
GRAPH I:

Width of lip opening in the four samples studied.



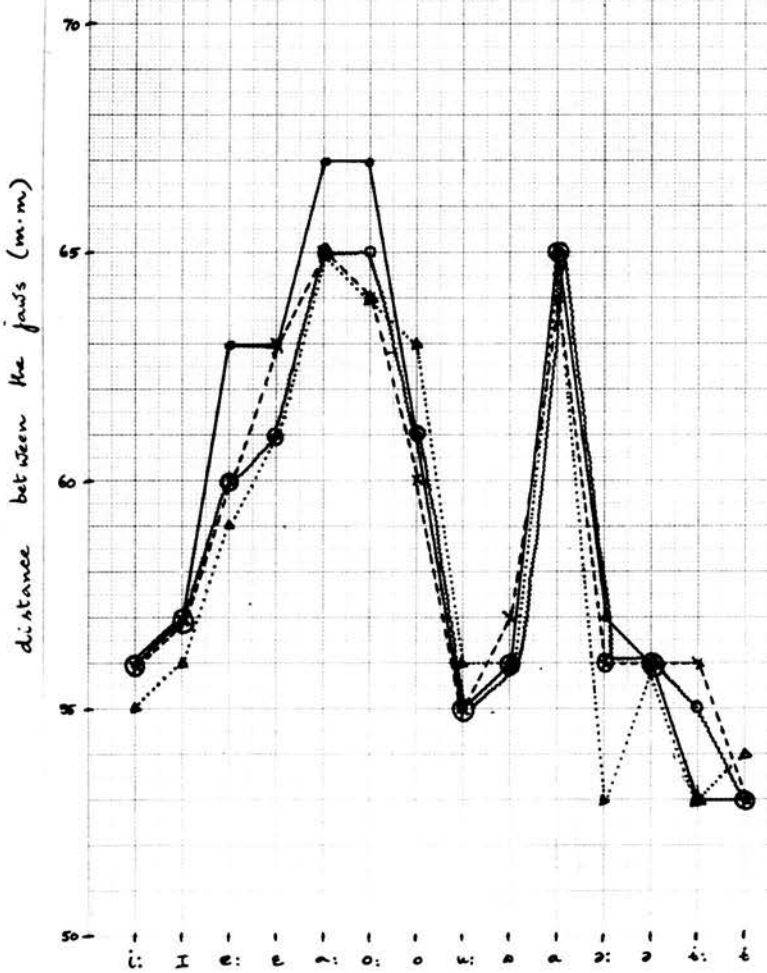
GRAPH II:

Height of lip opening in the four samples studied.



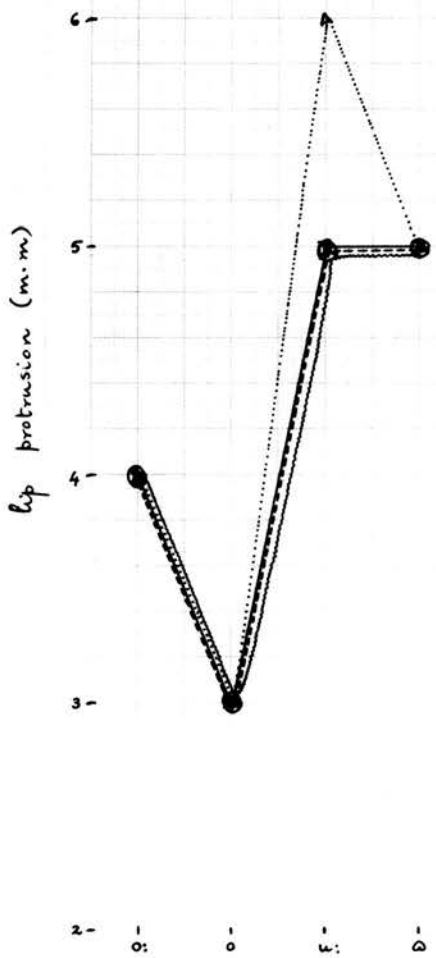
GRAPH III:

Distance between the jaws in the four samples studied.



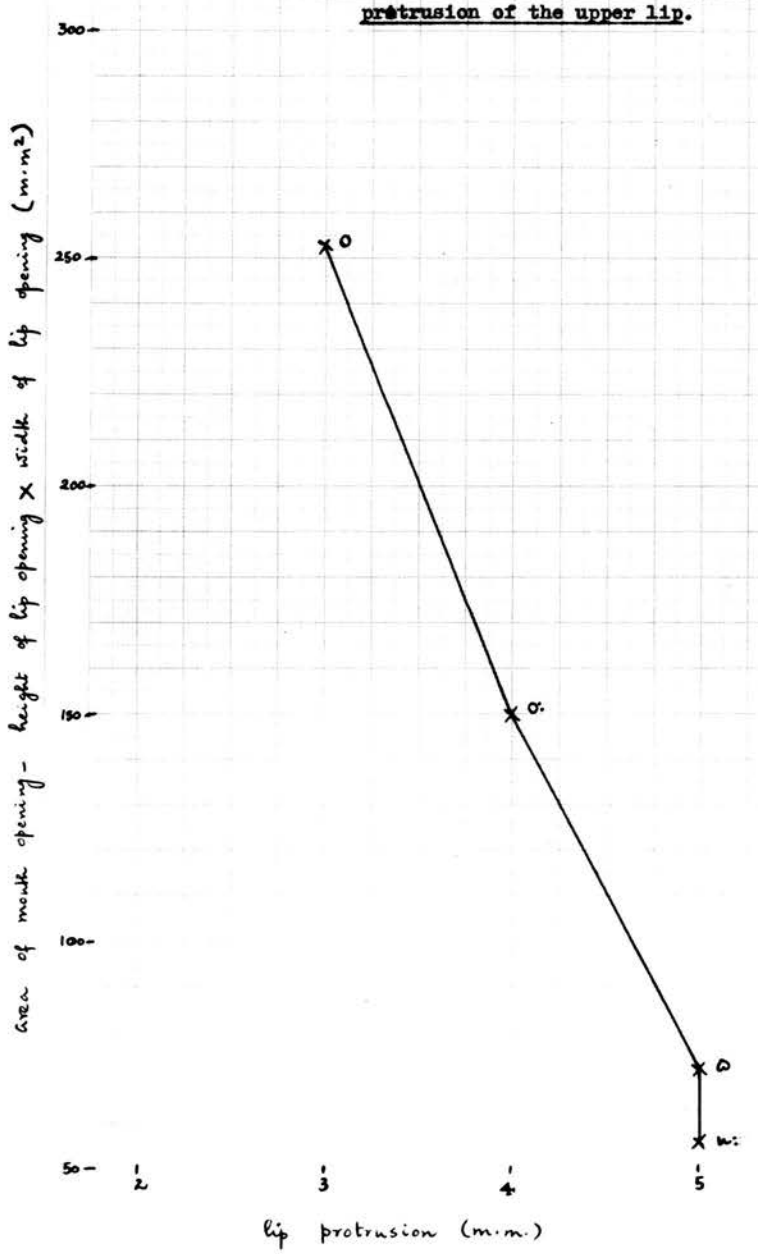
GRAPH IV:

Protrusion of the upper lip in the four samples studied.



GRAPH V:

Relation between the area of mouth opening and the prêtrusion of the upper lip.



Labiograms of the vowels under investigation

Lgm. 1 [i:]

Lgm. 2 [ɪ]

Lgm. 3 [e:]

Lgm. 4 [ɛ]

Lgm. 5 [a:]

Lgm. 6 [o:]

Lgm. 7 [o]

Lgm. 8 [u:]

Labiograms of the vowels under investigation- contd.

Lgm. 9 [ɔ]

Lgm. 10 [ɑ]

Lgm. 11 [ə:]

Lgm. 12 [ə]

Lgm. 13 [ɨ:]

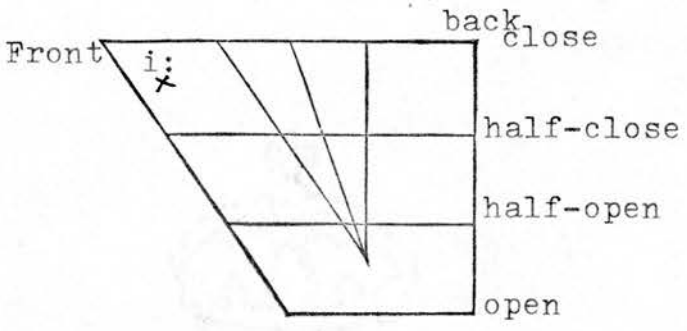
Lgm. 14 [ɨ]

4.1.33 Description and distribution of the vowels of Tamil:-

On the basis of the results of the various instrumental techniques adopted in examining the vowels of Tamil, each vowel is described below and their distributional possibilities are analysed.[12]

4.1.34 Number 1 [i:]

height of tongue:	very nearly 'close'
part of tongue) that is highest):	centre of the 'front'
position of lips:	spread
opening between) the jaws):	medium



4.1.35 In the present writer's speech, during the articulation of [i:] the tip of the tongue touches the lower teeth. The sides of the tongue touch the sides of the palate in the region extending from the third molar tooth to the first pre-molar tooth. (see palatogram 3).

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12. In describing the vowels, Daniel Jones' (1969 edition) method has been followed throughout. In the dialect under survey all vowels are voiced and hence the action of the vocal cords is not given in each individual vowel description. Since the vowels that are being described in this section are Oral vowels the position of the soft palate is not given in individual cases.

4.1.36 Distribution:- [i:] occurs initially, medially and finally in words. It should be mentioned here that the length of the vowel varies in different words in which the vowel occurs. This is discussed later under the heading "vowel length" (see 4.2.1 - 4.2.9). It should also be pointed out that in word-final position the occurrence of [i:] is limited. It occurs in vocatives and in very few other words.

Initially:-	[i:ɾχ]	(dampness)
	[i:jχ]	(lead - the metal)
	[i:]	(fly)
Medially:-	[ɸi:pʰɨ]	(comb - n.)
	[pʻi:ʈʰal]	(rags)
	[kʻi:ɾɛ]	(green vegetables)
Finally:-	[pʻa:ʈʻi:]	(grandmother ! - voc)
	[ma:mi:]	(aunt ! - voc)
	[ʧi:]	(fie !)
	[ɸi:]	(pus) [13]

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13. As pointed out earlier, the length of the vowel in these last four examples varies considerably, the vowels in the first two words being longer than the ones in the last two. However, if the vowel in the first two words can be notated [i:] and that in the last two [iʰ], it should be stated that [i:] and [iʰ] do not contrast with each other in minimal or near-minimal pairs and that if one is used for the other in any of these words and in other words in which [i:] or [iʰ] occurs, there is no potential confusion.

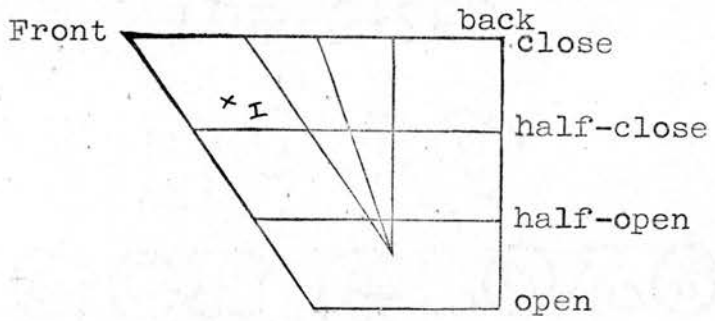
4.1.37 Number 2 [ɪ]

height of the tongue: between 'close' and 'half-close'

part of the tongue that is highest : back of the 'front'

position of lips: spread

opening between the jaws: medium



4.1.38 The tip of the tongue touches the lower teeth during the articulation of [ɪ] in the present writer's speech. The sides of the tongue touch the sides of the roof of the mouth in the same region as during the articulation of [i:]. (see palatogram 4).

4.1.39 Distribution:- [ɪ] occurs initially, medially and finally in a word.

Initially:-	[ɪp:ə]	(now)[14]
	[ɪl:ɛ]	(no)
	[ɪnd͡ʒɪ]	(ginger)
Medially:-	[p'ɪt͡:ʃɛ]	(alms)

14. In the speech of some people an initial on-glide [j] can be distinctly heard when they pronounce words with an initial [ɪ].

Medially:-	[ʈʻɪɾɪ]	(wick)
	[kʻɪʈːɑːɾ]	(canvas)
Finally:-	[kʻɑɾɪ]	(curry, charcoal)
	[nɑɾɪ]	(fox)
	[pʻɑɕɪ]	(hunger)

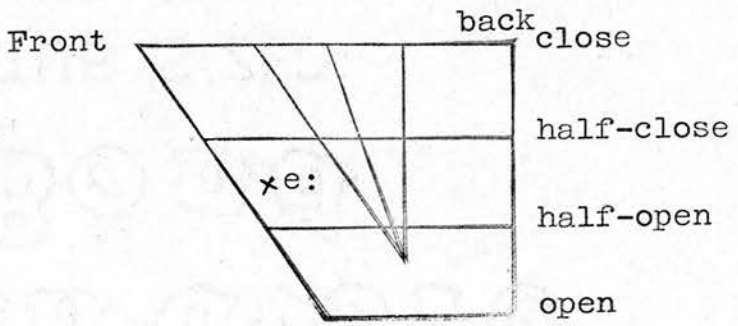
4.1.40 Number 3 [e:]

height of the tongue: between 'half-close' and 'half-open'

part of the tongue that is highest): the 'front'

position of the lips: neutral - neither too spread nor too rounded, the height of lip opening being more than for [i:] or [ɪ]

opening between the jaws): wide



4.1.41 During the articulation of the vowel [e:] the tip of the tongue touches the lower teeth in the present writer's speech. The sides of the tongue touch the sides of the roof of the mouth in the region extending from the third molar tooth to the first pre-molar tooth. But the contact between the sides of the tongue and the sides of the roof of the mouth is firm only in the molar

region, while in the pre-molar region the contact seems very weak. (see palatogram 5).

4.1.42 Distribution:- [e:] occurs only medially in a word in the normal stream of speech. In word-final position it occurs in special circumstances like a hawker calling out his wares. Orthographic initial e: is [je:]in speech, with an initial palatal on-glide.

Medial occurrence of [e:]:-

[je:lɤ]	(auction)
[je:ɾɪ]	(lake)
[me:lɛ]	(above)
[p'e:ɾɨ]	(name)

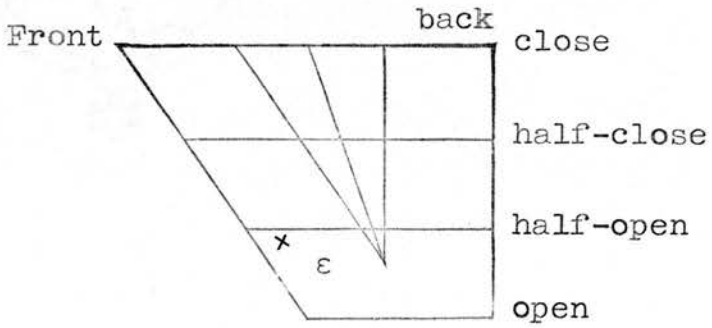
4.1.43 Number 4 [ɛ]

height of the tongue: between 'half-open' and 'open' but much nearer 'half-open' than 'open'.

part of the tongue) that is highest): the 'front'

position of the lips: neutral

opening between the jaws): wide



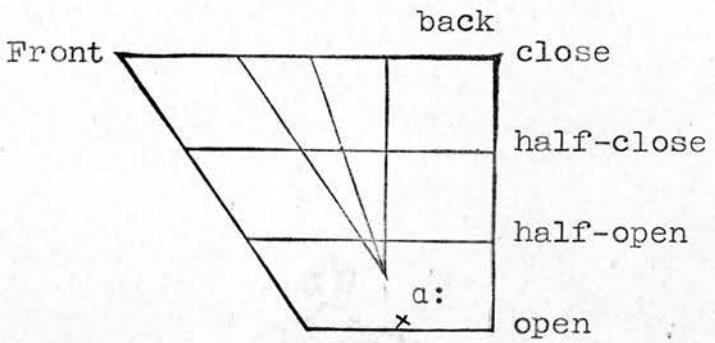
4.1.44 During the articulation of [ɛ] the tongue-tip touches the lower teeth in the present writer's speech. The sides of the tongue touch the sides of the roof of the mouth, but the contact area is much narrower than for [e:] and also, the contact does not seem to be very firm (see palatogram 6).

4.1.45 Distribution:- [ɛ] occurs medially and finally in a word. It does not occur initially, orthographic initial e being [jɛ] in speech, with an initial palatal on-glide.

Medially:-	[jɛlɪ]	(rat)
	[t̪ʻɛɾɨ]	(street)
	[nɛɾɨpʻɨ]	(fire)
Finally:-	[jɛlɛ]	(leaf)
	[mɑ:lɛ]	(garland)
	[t̪ʻɑlɛ]	(head)

4.1.46 Number 5 [ɑ:]

height of the tongue:	fully open
part of the tongue that is highest:	a point slightly in advance of the 'back'
position of lips:	neutral, with the height of lip opening more than for [i:], [ɪ], [e:] and [ɛ].
opening between the jaws:	very wide



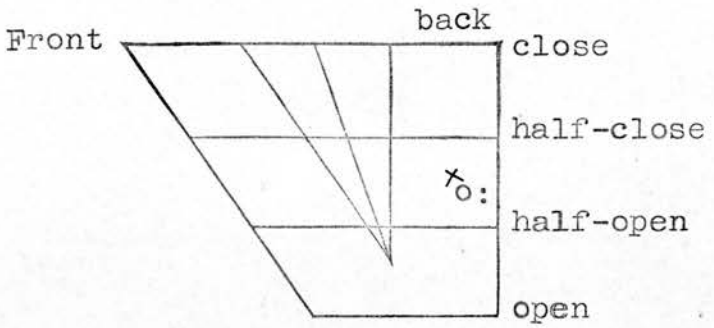
4.1.47 During the articulation of [a:] the tip of the tongue is very much retracted from the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth (see palatogram 7).

4.1.48 Distribution:- [a:] occurs initially, medially and finally in words.

Initially:-	[a:ʐą̃]	(depth)
	[a:mɑ̃:]	(yes)
	[a:ʂɨ]	(six)
Medially:-	[pʻa:tʻɨ]	(song)
	[pʻa:tʻɪ]	(grandmother)
	[kʻa:ɕɨ]	(money)
Finally:-	[pʻa:pʻa:]	(child)
	[ap:a:]	(father)
	[tʂʻa:tʂʻa:]	(grandfather)

4.1.49 Number 6[o:]

height of the tongue:	between half-open and half-close.
part of the tongue that is highest):	the 'back'
position of lips:	open lip-rounding
opening between the jaws):	very wide



4.1.50 During the articulation of [o:] the tip of the tongue is retracted from the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth (see palatogram 9).

4.1.51 Distribution:- [o:] occurs medially and finally in words. Word-initial orthographic o: is [wo:] in speech, with an initial labio-velar on-glide.

Medially:- [wo:ʈʻo] (drive - imp.)
[wo:ɽo] (run - imp.)
[kʻo:ʈʻɛ] (castle)
[t͡ʂʻo:ʈʻɤ] (garden)

Finally:- [pʻo:] (go - imp.)
[pʻo:ŋgo:] (go - honorific - imp.)

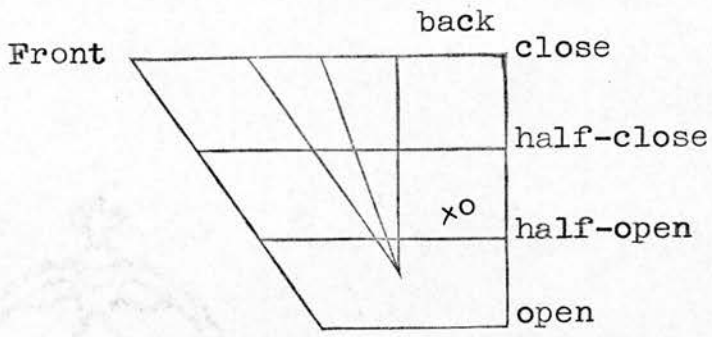
4.1.52 **Number 7 [o]**

height of the tongue: between half open and half-close.

part of the tongue that is highest: the 'back'

position of lips: very open lip-rounding, opener lip-rounding than for [o:]

opening between the jaws: wide



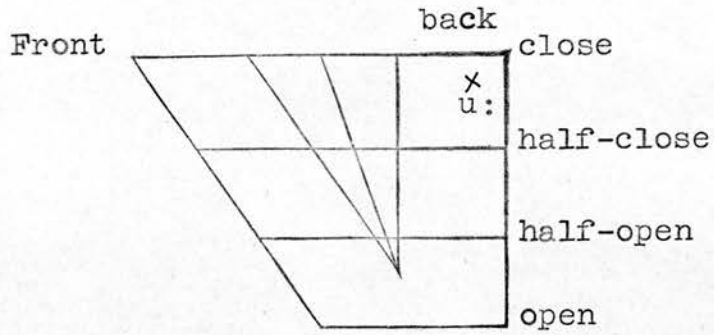
4.1.53 During the articulation of [o] the tip of the tongue does not touch the lower teeth, nor do the sides of the tongue touch the sides of the roof of the mouth. (see palatogram 10).

4.1.54 Distribution:- [o] occurs only medially in a word. Word-initial orthographic o is [wo] in speech, with an initial labio-velar on-glide.

[woɾo]	(one)
[woʈ:o]	(paste - imp.)
[moʈ:o]	(bud)
[ʈ'oɾo]	(touch - imp.)

4.1.55 **Number 8 [u:]**

height of the tongue:	very nearly close
part of the tongue that is highest:	the 'back'
position of lips:	close lip-rounding
opening between the jaws:	medium



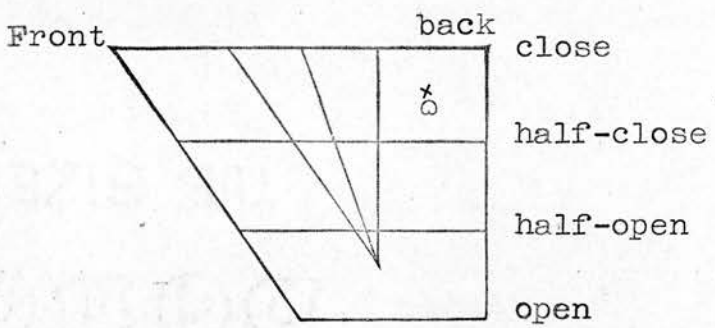
4.1.56 During the articulation of [u:] the tip of the tongue is retracted from the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth. (see palatogram 11).

4.1.57 Distribution:- [u:] occurs very freely in word-initial and word-medial positions. In word-final position it occurs in very few words and in vocatives.

Initially:-	[u:mɛ]	(dumb person)
	[u:ɕɪ]	(needle)
	[u:ɾɷ]	(town)
Medially:-	[pʻu:tʻɷ]	(lock)
	[mu:tʻɛ]	(bundle)
	[kʻu:tʻɷ]	(a type of curry)
Finally:-	[pʻu:]	(flower)
	[pʻɑ:ɾu:]	(Paroo ! - voc.)

4.1.58 Number 9 [ɷ]

height of the tongue:	between close and half-close
part of the tongue) that is highest):	the fore part of the 'back'
position of lips:	close lip-rounding
opening between the jaws)	medium



4.1.59 During the articulation of [ɷ] the tip of the tongue is retracted from the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth. (see palatogram 12).

4.1.60 Distribution:- [ɷ] occurs initially, medially and finally in a word.

Initially:-	[ɷp:ɷ]	(salt)
	[ɷmɪ]	(husk)
	[ɷɭɪ]	(chisel - n)
Medially:-	[kʻɷp:ɛ]	(rubbish)
	[mɷʈ:ɛ]	(egg)
	[pʻɷʐɷ]	(worm)
Finally:-	[pʻu:ʈʻɷ]	(lock)

Finally:- [k'oʈ:ɑ] (throw - imp.)

[p'oɳ:ɑ] (girl)

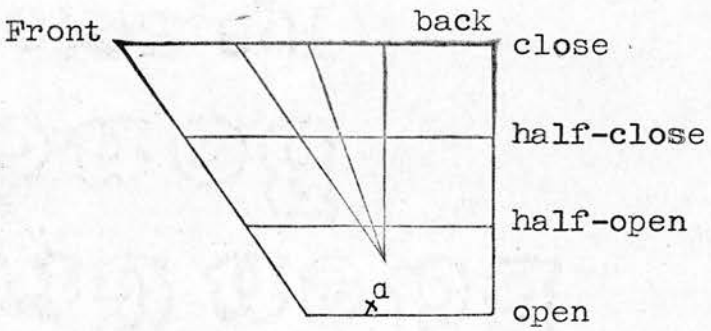
4.1.61. **Number 10 [a]**

height of the tongue: open

part of the tongue) that is highest) a point slightly in advance of the 'back'

position of lips: neutral

opening between the jaws): very wide



4.1.62 During the articulation of [a] the tip of the tongue is retracted from the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth. (see palatogram 8).

4.1.63 Distribution:- [a] occurs initially and medially in a word.

Initially:- [ap:a:] (father)

[am:a:] (mother)

[aðɨ] (it)

Medially:- [p'aʈ:ɨ] (ten)

[p'aɽχ] (picture)

[k'aɽɛ] (shop)

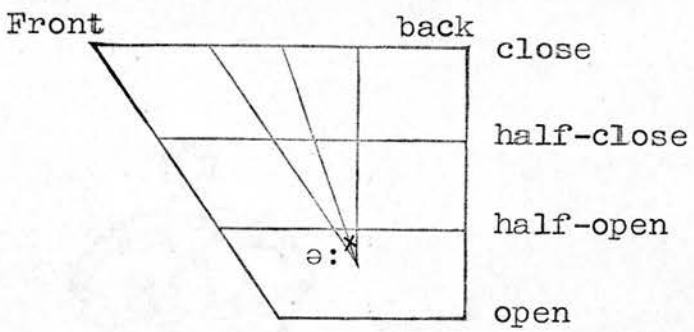
4.1.64 **Number 11 [ə:]**

height of the tongue: between half-open and open, but nearer half-open

part of the tongue that is highest): the 'centre'

position of lips: spread

opening between the jaws): medium



4.1.65 During the articulation of [ə:] the tip of the tongue does not touch the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth. (see palatogram 13).

4.1.66 Distribution:- [ə:] occurs in word-initial and word-medial positions.

Initially:-	[ə:ɾɪ]	(having climbed)
	[ə:ʐɨ]	(seven)
	[ə:ʐɛ]	(poor man)
Medially:-	[ɕə:pʻɨ]	(red)
	[ɕə:ɾɨ]	(slush)
	[t̪ʻə:l̪ɨ]	(scorpion)

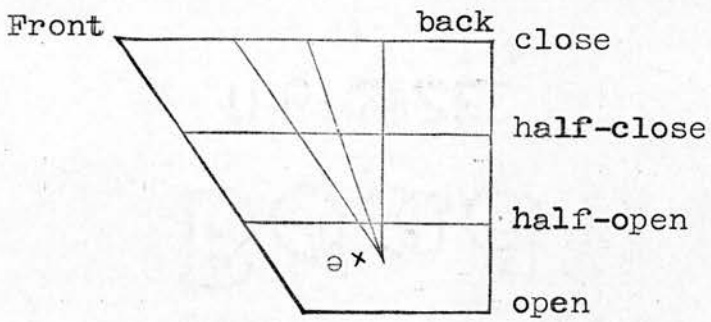
4.1.67 **Number 12 [ə]**

height of the tongue: between half-open and open; slightly opener than [ɐ:] described above.

part of the tongue that is highest): the 'centre'

position of lips: spread

opening between the jaws): medium



4.1.68 During the articulation of [ə] the tip of the tongue does not touch the lower teeth. The sides of the tongue do not touch the sides of the roof of the mouth. (see palatogram 14).

4.1.69 Distribution:- [ə] occurs initially, medially and finally in a word.

Initially:-	[əʈ:ɨ]	(eight)
	[əʈ:ɪ]	(far away)
	[əɳ:ɨ]	(count - imp.)
Medially:-	[kʻəʈ:ɨ]	(having lost)
	[ʈʻərə]	(open - imp.)
Finally:-	[ɑvə]	(she)
	[pʻo:ɽə]	(to put)
	[pʻɑ:kʻə]	(to see)

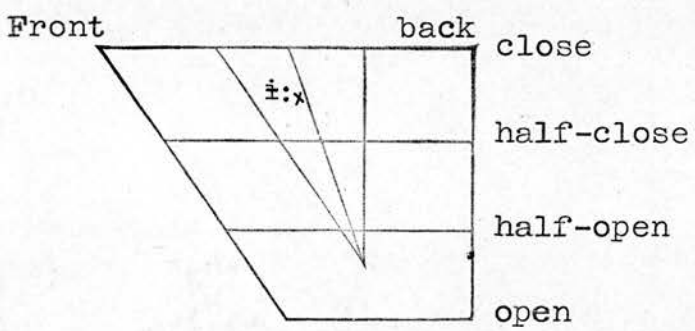
4.1.70 Number 13 [ɨː]

height of the tongue: between close and half-close

part of the tongue that is highest): the 'centre'

position of lips: spread

opening between the jaws): medium



4.1.71 During the articulation of [ɨː] the tip of the tongue does not touch the lower teeth. The sides of the tongue touch the sides of the roof of the mouth in the region of the molar teeth. (see palatogram 15).

4.1.72 Distribution:- [ɨː] occurs initially and medially in a word.

Initially:- [ɨːʈʰɪ] (spear)

[ɨːɽɨ] (an equivalent)

Medially:- [kʻɨːʐɛ] (down)

[t̪ʻɨːʈʰɨ] (sharpen - imp.)

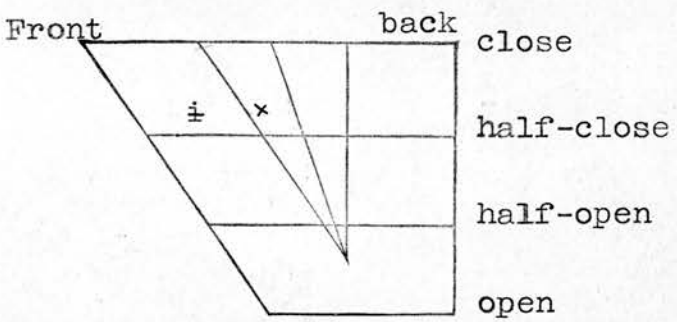
4.1.73 Number 14 [ɨ]

height of the tongue: between half-close and close

part of the tongue that is highest): the 'centre'

position of lips: spread

opening between the jaws): medium



4.1.74 During the articulation of [ɨ] the tip of the tongue does not touch the lower teeth. The sides of the tongue touch the sides of the roof of the mouth in the region of the molar teeth. (see palatogram 16).

4.1.75 Distribution:- [ɨ] occurs initially, medially and finally in a word. In word-final position its frequency of occurrence is more than that of any other vowel.

Initially:- [ɨʈɨ] (take - imp.)

[ɨʐɨ] (pull - imp.)

[ɨʐɨʈ̚ʲɨ] (letter of the alphabet)

Medially:- [ɾʂɨkʲɨ] (it is)

Medially:-	[kʻɨʈːə]	(nearby)
	[kʻɨɭɪ]	(parrot)
Finally:-	[mɑːʈ̚ʻɨ]	(change - imp.)
	[pʻɑːkʻɨ]	(arecanut)
	[ʈ̚ʻiːɾpɨ]	(judgement)
	[kʻɑzɨʈ̚ʻɨ]	(neck)
	[pʻɑɲʤɨ]	(cotton)
	[ɑɲʤɨ]	(five)

4.1.76 A note on word-final [o:], [u:] and [ɷ]:-

In disyllabic, trisyllabic and polysyllabic words, the rounded back vowels [o:], [u:] and [ɷ] occur in word-final position only if there is another back rounded vowel in the preceding syllable(s)[15] With a rounded back vowel in say, the first syllable of a disyllabic word, the vowel in the second syllable may be a front vowel, a central vowel or a back vowel. But with a front or central vowel in the first syllable of a disyllabic word, the vowel in the second syllable is invariably not a back rounded vowel. Thus [pʻoʈːɪ] (box) and [pʻoːɽə] (to put) occur in the dialect - the vowel in the second syllable is a front vowel in the first case and a central vowel in the second case though the vowel in the first syllable is a rounded back vowel in either

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15. [o] does not occur finally in a word. See 4.1.54.

case. But a word like [pɑʈ:o] does not occur. Orthographically pattu, pa:ttu, pottu, po:ttu, puttu, pu:ttu - all occur. But in the speech of the present writer, these words are [p'ɑʈ:ɨ] (silk), [p'ɑ:ʈ'ɨ] (song), [p'oʈ:o] (caste-mark), [p'o:ʈ'o] (having put), [p'ʊʈ:o] (a breakfast savoury) and [p'u:ʈ'o] (lock) respectively. To cite a couple of trisyllabic words, orthographic paruppu and poruppu are [p'ɑrɨp'ɨ] (lentils) and [p'orʊp'o] (responsibility) respectively in speech. In other words, a rounded back vowel appears in word-final position in words of more than one syllable only if there is a back rounded vowel in the preceding syllable(s). There are three exceptions - [p'ɑ:ro] (a proper noun), [lɑɖ:o] (a sweetmeat) and [mɑɳɖo] (a foolish person).

4.2 Vowel-length:-

4.2.1 Seven of the fourteen vowels described in the preceding pages are transcribed with a length-mark [:] and seven others without it. The question arises here as to the criterion behind using the length-mark and if any statistical minimum of duration was fixed for purposes of determining whether a vowel is long or short. In the colloquial dialect of Tamil under survey (and indeed in every dialect of Tamil, colloquial or formal) the 'long' and the 'short' vowels contrast with each other in

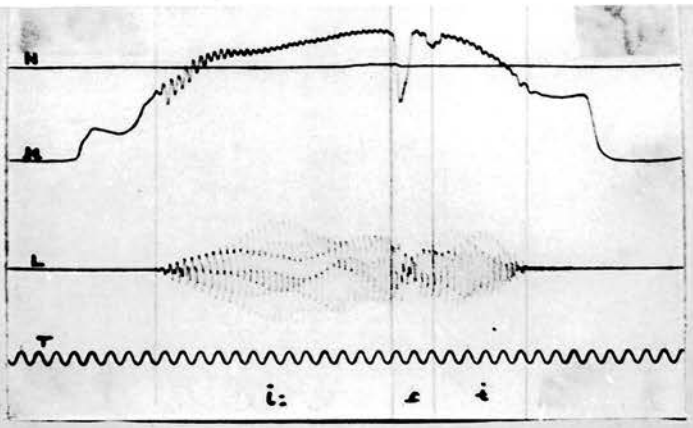
minimal pairs. The vowels transcribed [i:], [e:], [ɑ:], [o:], [u:], [ə:] and [ɨ:] are longer than the vowels transcribed [ɪ], [ɛ], [ɑ], [o], [ʊ], [ə] and [ɨ] respectively in identical phonetic environments. One minimal pair of words for each pair of 'long' and 'short' vowels is given below:

4.2.2

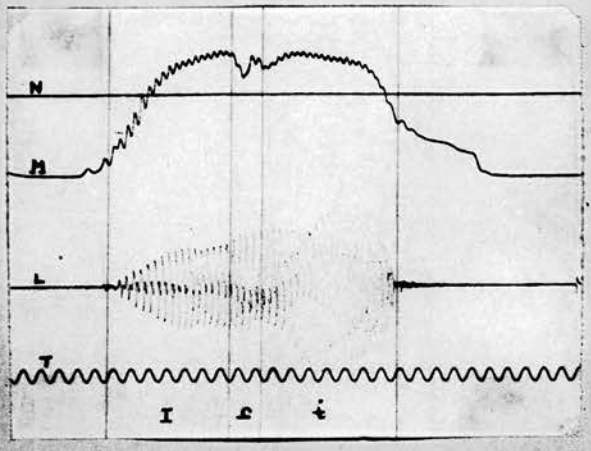
[i:]and[ɪ]:	[i:ɾɨ]	(gums)	- [ɪɾɨ]	(stay - imp.)
[e:]and[ɛ]:	[t̪ʻe:kʻɨ]	(teak wood)	- [t̪ʻɛk:ɨ]	(south)
[ɑ:]and[ɑ]:	[pʻɑ:tʻɨ]	(song)	- [pʻɑt:ɨ]	(silk)
[o:]and[o]:	[t̪ʻo:tʻɪ]	(scavenger)	- [t̪ʻot:ɪ]	(tub)
[u:]and[ʊ]:	[pʻu:tʻʊ]	(lock)	- [pʻʊt:ʊ]	(a breakfast savoury)
[ə:]and[ə]:	[kʻə:tʻɨ]	(having asked)	- [kʻət:ɨ]	(having lost)
[ɨ:]and[ɨ]:	[ɨ:ʈɨ]	(an equivalent)	- [ɨʈɨ]	(take - imp.)

4.2.3 The vowel [i:] in the word [i:ɾɨ] (gums) is longer than the vowel [ɪ] in the word [ɪɾɨ] (stay-imp.). Similarly, the vowel transcribed with the length-mark [:] in each of the above sets of words is longer than the one transcribed without the length-mark in the corresponding word forming the minimal pair.

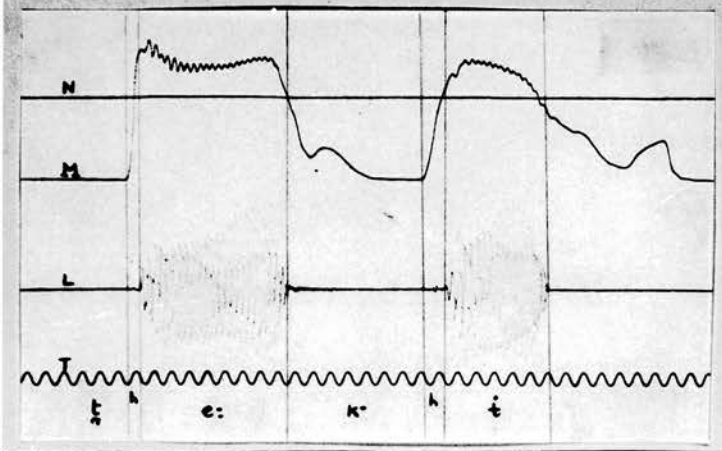
Kymograms of the 14 words given above are reproduced on the following pages and the duration of the vowels in question is tabulated.



Kgm. 3 [i:ɾi] (gums)

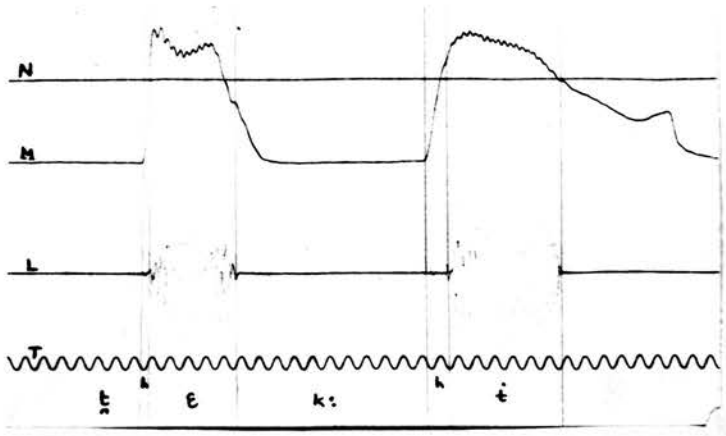


Kgm. 4 [ɪ ɾ i] (stay-imp.)

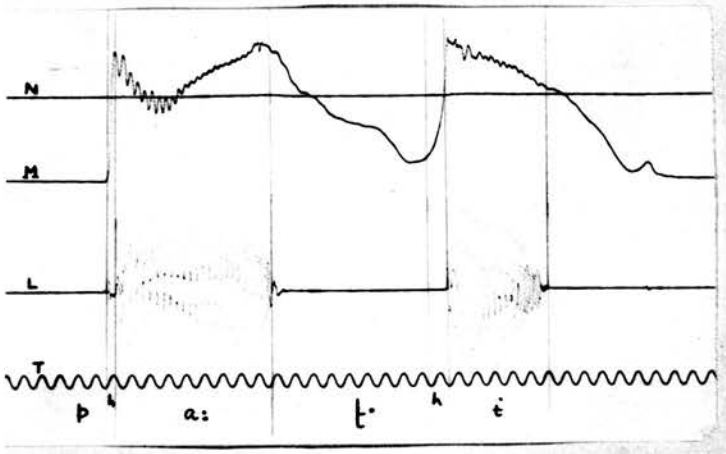


Kgm. 5 [t̪ʰe:k·ʰi] (teakwood)

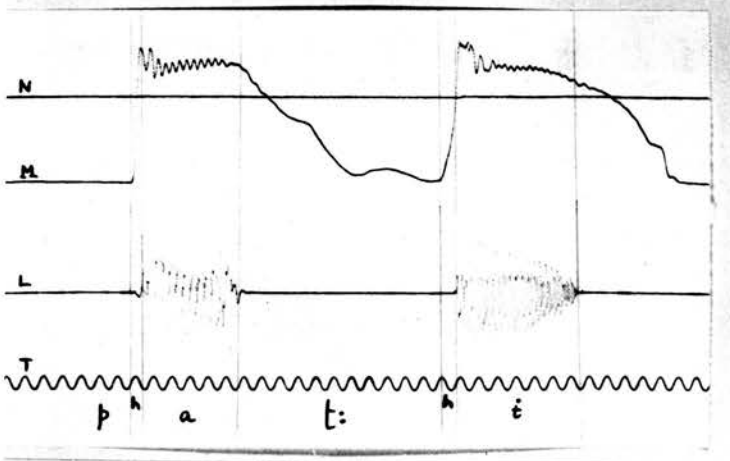
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 6 [t̪ɛk:i] (south)

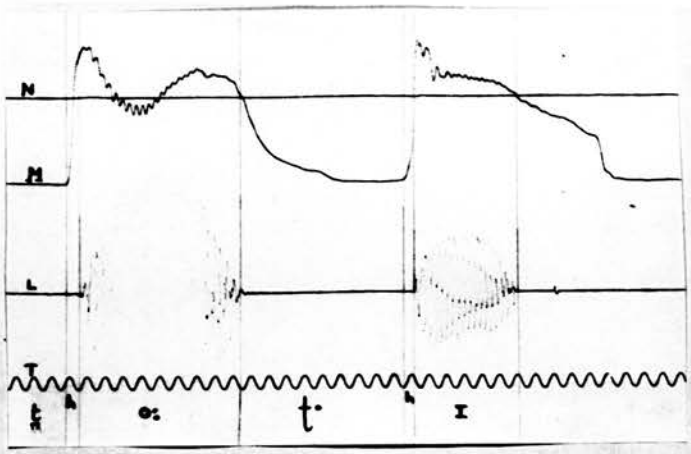


Kgm. 7 [pʰ:t̚i] (song)

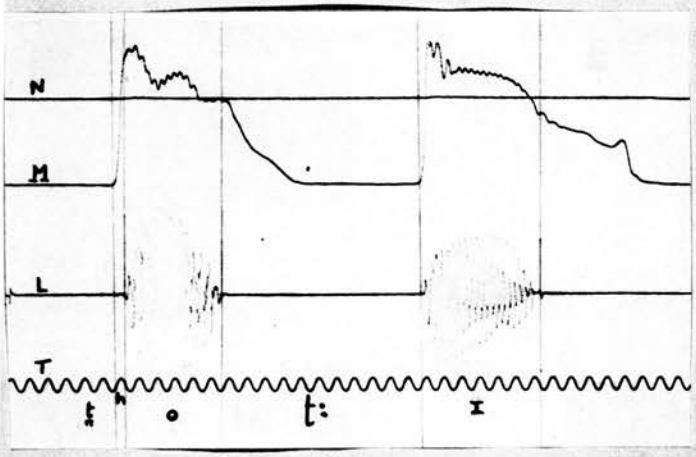


Kgm. 8 [p'a.t̚:i] (silk)

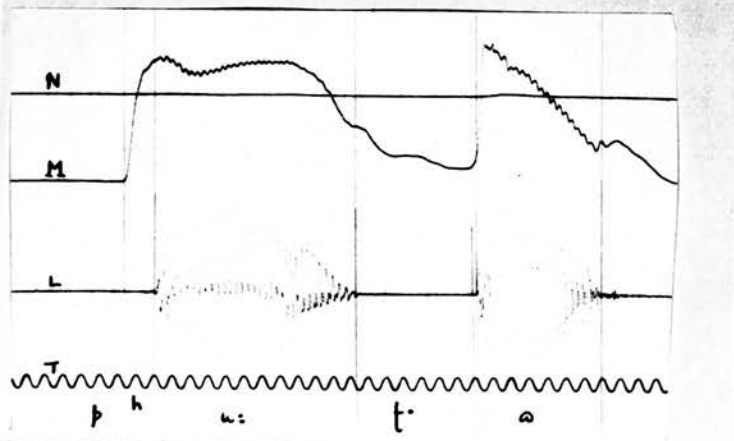
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 9 [t̪ʰo:tɪ] (scavenger)

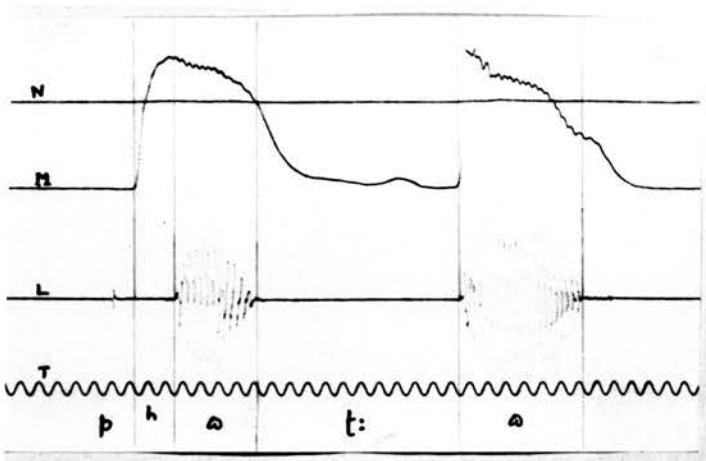


Kgm. 10 [t̪ʰot:ɪ] (tub)

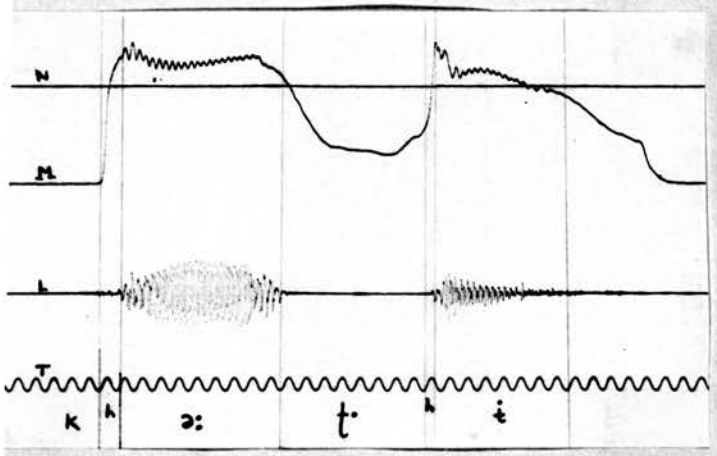


Kgm. 11 [pʰu:tə] (lock)

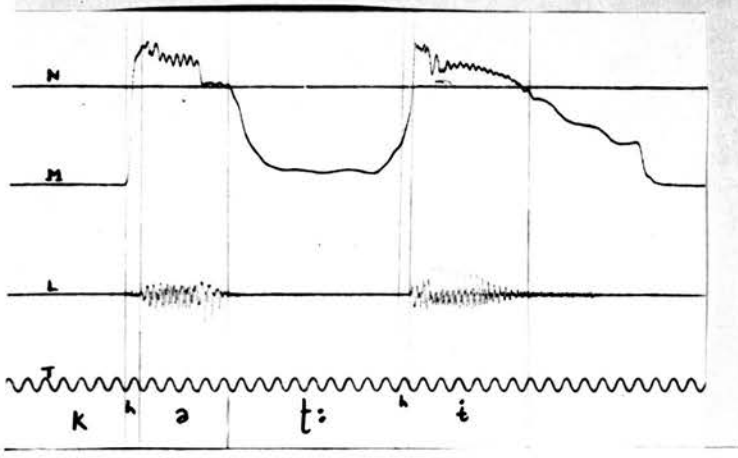
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 12 [pʻɑtːɑ] (a breakfast savoury)

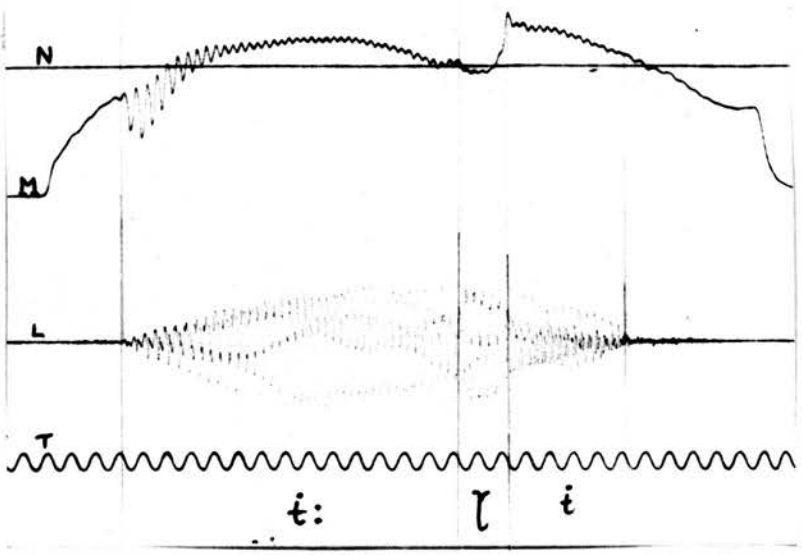


Kgm. 13 [kʻɔːtˑi] (having asked)

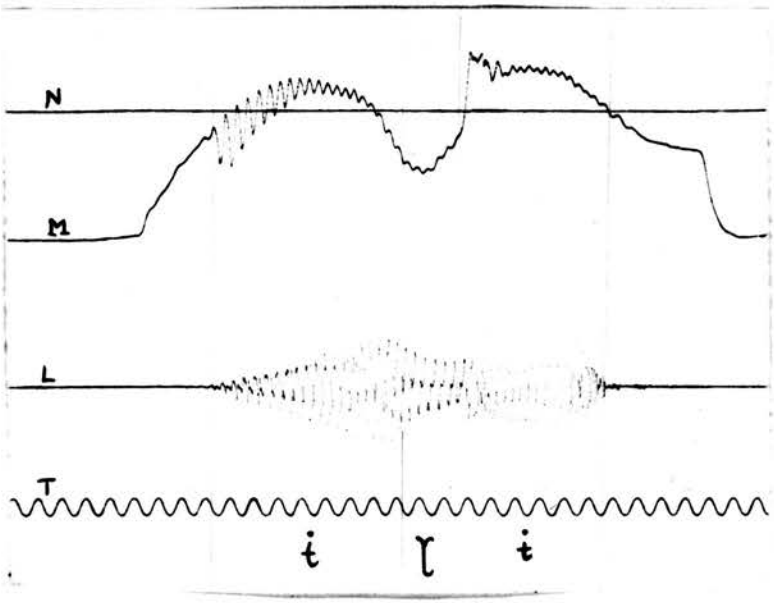


Kgm. 14 [kʻɔtːi] (having lost)

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 15 [iɾi] (an equivalent)



Kgm. 16 [iɾi] (take-imp.)

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

4.2.4 The duration of the vowels in the first syllables of the words whose kymograms are given above is tabulated below:-

Table 7:-

Word & gloss	vowel	duration m/secs.	Word & gloss	vowel	duration m/secs
[i:ɾɨ] (gums)	[i:]	265	[ɪɾɨ] (stay-imp.)	[ɪ]	135
[t̪ʻe:kʻɨ] (teak wood)	[e:]	165	[t̪ʻɛk:ɨ] (south)	[ɛ]	95
[pʻa:ʈʻɨ] (song)	[a:]	170	[pʻaʈ:ɨ] (silk)	[a]	105
[t̪ʻo:ʈʻɪ] (scavenger)	[o:]	180	[t̪ʻoʈ:ɪ] (tub)	[o]	110
[pʻu:ʈʻɷ] (lock)	[u:]	225	[pʻɷʈ:ɷ] (a break-fast savoury)	[ɷ]	95
[kʻə:ʈʻɨ] (having asked)	[ə:]	180	[kʻəʈ:ɨ] (having lost)	[ə]	100
[ɨ:ɽɨ] (an equiv-alent)	[ɨ:]	280	[ɨɽɨ] (take-imp.)	[ɨ]	160

It can be seen from the Table above that the 'short' vowel [ɨ] in the word [ɨɽɨ] (take-imp.) is almost as long as some of the 'long' vowels analysed. Still the vowel [ɨ] in the word [ɨɽɨ] is written without the length mark and the vowel [e:] in the word [t̪ʻe:kʻɨ] (teak wood) is written with the length mark. This is

because the 'long' vowels are longer than their corresponding 'short' vowels in identical phonetic environments. Thus [i:] is always longer than [ɪ], [e:] is always longer than [ɛ], [a:] is always longer than [a], [u:] is always longer than [ʊ], [o:] is always longer than [o], [ə:] is always longer than [ə], and [ɨ:] is always longer than [ɨ] in identical phonetic environments.

4.2.5 Apart from the difference in the duration of vowels discussed above, the duration of each vowel differs according to its phonetic environment. In the dialect of Tamil under survey a 'long' vowel can occur in:-

(1) Word-initial position[16] followed by

(a) a tense long voiceless stop - [a:ʈ°ɨ][17] (shake - imp.)

(b) a voiced flap - [a:ɽɨ] (goat), a voiced fricative - [a:βaʈ°ɨ] (danger) or a voiceless fricative - [a:ɸɛ] (desire)

(c) a short voiced nasal or lateral -

[a:mɛ] (tortoise)

[a:ɭɨ] (man)

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16. except [e:] and [o:]. see 4.1.42 and 4.1.51.

17. The voiceless retroflex stop has been transcribed with the length mark [°] (indicating a partially lengthened segment) because any voiceless stop consonant is much longer if preceded by a short vowel as in [aʈ:ɛ] (cardboard). see chapter V.

(2) Word-medial position followed by:

(a) a tense, long voiceless stop - [pʻɑ:ʈʻɨ] (song)

(b) a voiced flap - [pʻɑ:ɽɨ] (sing - imp.), a voiced fricative - [kʻɑ:ðɨ] (ear) or a voiceless fricative - [pʻɑ:ɸɪ] (moss)

(c) a short voiced nasal or lateral -
[pʻɑ:nɛ] (pot)
[pʻɑ:l] ~ [pʻɑ:lɨ] (milk)

(d) an approximant or a semi-vowel -
[ʈʻɑ:ʐɛ] (a type of flower)
[pʻɑ:j] ~ [pʻɑ:jɪ] (mat)

(3) Word-final position.[18]

4.2.6 A 'short' vowel can occur in:

(1) Word-initial position[19] followed by:-

(a) a tense, long voiceless stop - [ɑʈ:ɛ] (cardboard)

(b) a voiced fricative - [ɑðɨ] (it)

(c) a voiceless fricative - [ɑɸɛ] (ruminating)

(d) a voiced flap - [ɑɽɪ] (beat - imp.)

(e) a short voiced lateral - [ɷlɪ] (chisel-n).

(f) a long voiced lateral - [ɵl:ɨ] (gingelly seeds)

(g) an approximant - [ɑʐɪ] (erase - imp.)

(h) a short voiced nasal - [ɑɳɛ] (dam)

(i) a long voiced nasal - [ɑɳ:ɑ:] (elder brother)

(j) another vowel forming a diphthong -[ɑijo:] (alas!)

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18. except [e:], [ɵ:] and [ɨ:]. see 4.1.42, 4.1.66 and 4.1.72.

19. except [ɛ] and [o]. see 4.1.45 and 4.1.54.

(2) Word-medial position followed by:-

(a) a tense, long voiceless stop - [p'ɑʈ:ɨ] (silk)

(b) a short voiceless stop - [ɷpmɑ:] (a savoury made with semolina)

(c) a long voiced lateral - [p'ɑl:ɪ] (lizard)

(d) a short voiced lateral - [p'ɷlɪ] (tamarind)

(e) a long voiced nasal - [p'ɑn:ɪ] (pig)

(f) a short voiced nasal - [p'ɑnɪ] (dew)

(g) a voiced flap - [p'ɑɽɛ] (troops)

(h) a voiced fricative - [p'ɑβɛ] (enmity)

(i) a voiceless fricative - [p'ɑɸɛ] (glue)

(j) an approximant - [p'ɑɻɪ] (guilt)

(k) a semi vowel - [nɛj] - [nɛj:ɪ] (clarified butter)

(l) another vowel forming a diphthong - [p'ɑi] (bag)

(3) Word-final position.[20]

4.2.7 Several kymograms were made in order to check the duration of vowels in these various phonetic environments. It was found that:-

(a) Vowels, whether initially or medially in a word, are longer if followed by a voiced consonant than if followed by a voiceless consonant. Thus in the two words [u:t̪'ɷ] (pour - imp) and [u:ðɷ] (blow - imp), the [u:] in [u:ðɷ] is longer than the [u:] in [u:t̪'ɷ]. Similarly, in the two words [k'ɑ:t̪'ɨ] (wind) and [k'ɑ:ðɨ] (ear), the [ɑ:] in [k'ɑ:ðɨ] is longer than the [ɑ:] in [k'ɑ:t̪'ɨ].

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20. except [ɑ] and [o]. see 4.1.54 and 4.1.63.

(b) But word-initial vowels followed by a voiced consonant are longer than word-medial vowels followed by a voiced consonant. Thus in the two words [a:ɽɨ] (dance - imp.) and [pʻa:ɽɨ] (sing - imp.), the [a:] in [a:ɽɨ] is longer than the [a:] in [pʻa:ɽɨ].

(c) Similarly, word-initial vowels followed by a voiceless consonant, though shorter than word-initial vowels followed by a voiced consonant, are longer than word-medial vowels followed by a voiceless consonant. Thus in the four words [a:ɽɨ] (dance - imp.), [pʻa:ɽɨ] (sing - imp.), [a:ʈʻɨ] (shake - imp.) and [pʻa:ʈʻɨ] (song), the [a:] in [a:ɽɨ] has the maximum duration and the [a:] in [pʻa:ʈʻɨ] the minimum duration. Of the [a:]^{s} in [a:ʈʻɨ] and [pʻa:ɽɨ], the [a:] in [pʻa:ɽɨ], being followed by a voiced consonant, is longer than the [a:] in [a:ʈʻɨ], which is followed by a voiceless consonant.

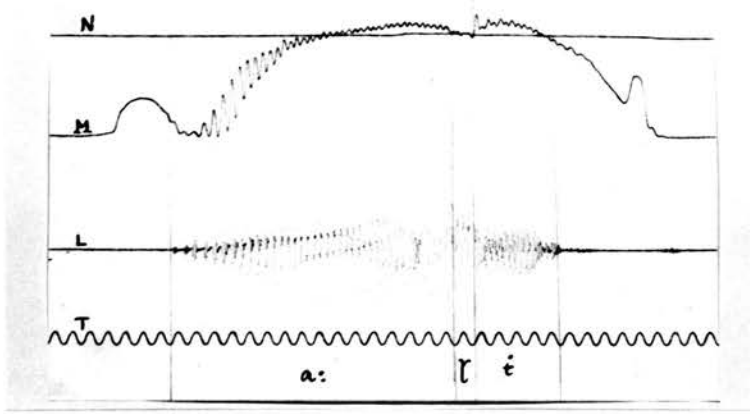
(d) This phenomenon is true of the 'short' vowels, too. In the four words [aɽɛ] (a kind of cake), [aʈ:ɛ] (cardboard), [pʻaɽɛ] (troops) and [pʻaʈ:ɛ] (bark of a tree), the [a] in [aɽɛ] has the maximum duration and the [a] in [pʻaʈ:ɛ] the minimum duration. Of the other two, the [a] in [pʻaɽɛ] is longer than the [a] in [aʈ:ɛ].

(e) The vowels are shorter when followed by a long consonant than they are when followed by a short consonant. Thus the [ɑ] in [pʻɑlɪ] (tamarind) is

longer than the [ɑ] in [pʻɑɭ:ɪ]. Similarly, the [a] in [maŋɛ] (plank) is longer than the [a] in [maŋ:ɛ] (mud - acc.)

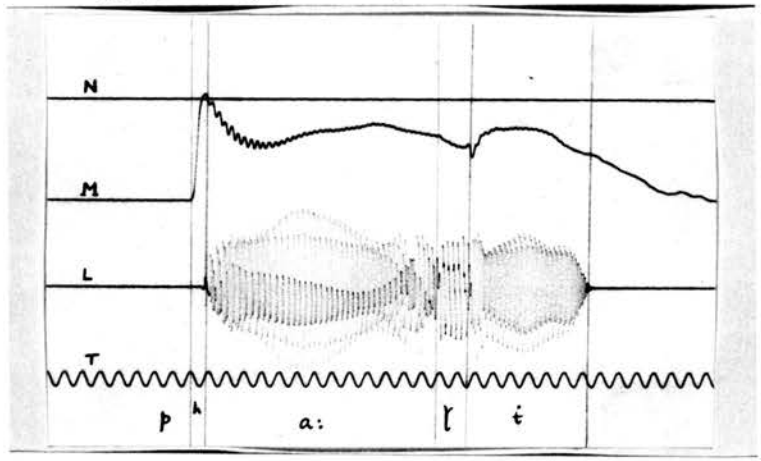
(f) Word-final vowels are slightly shorter in duration than the same vowels in word-initial or word-medial positions. But word-final vowels are very long in vocatives.

These phenomena are illustrated below with the help of a few kymograms. The kymograms are roughly segmented.



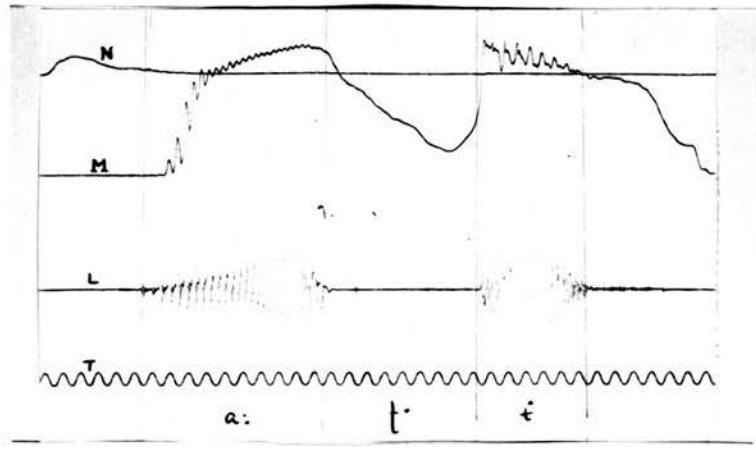
Kgm. 17 [a:ɾ i] (dance- imp.)

Word-initial [a:] followed by a voiced consonant



Kgm. 18 [p'a:ɾi] (sing- imp.)

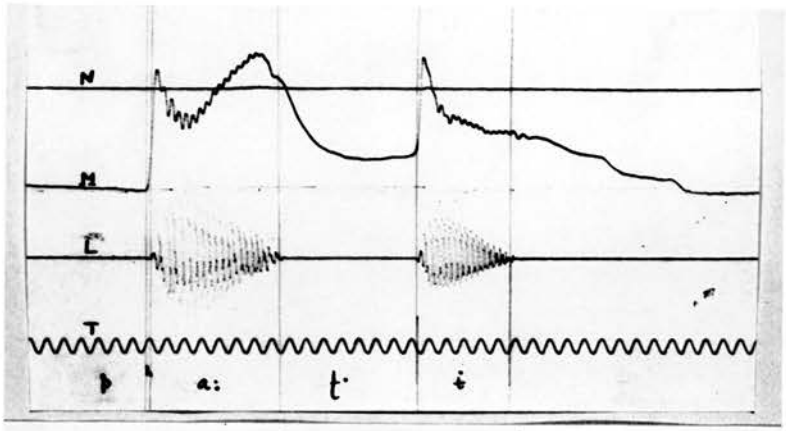
Word-medial [a:] followed by a voiced consonant



Kgm. 19 [a:ʈ·i] (shake- imp.)

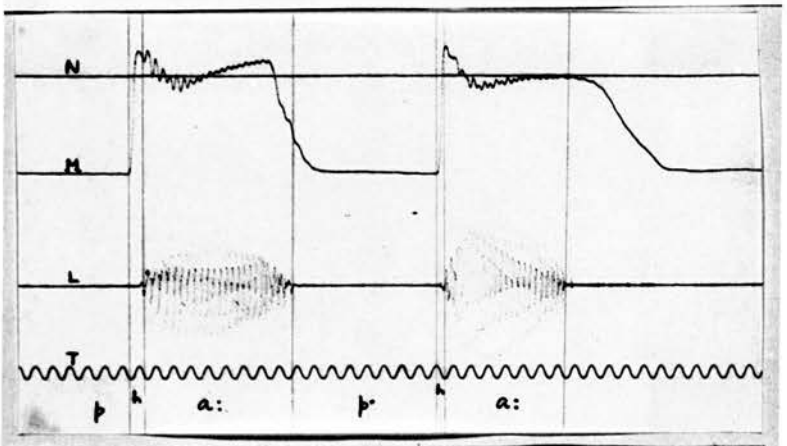
Word-initial [a:] followed by a voiceless consonant

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



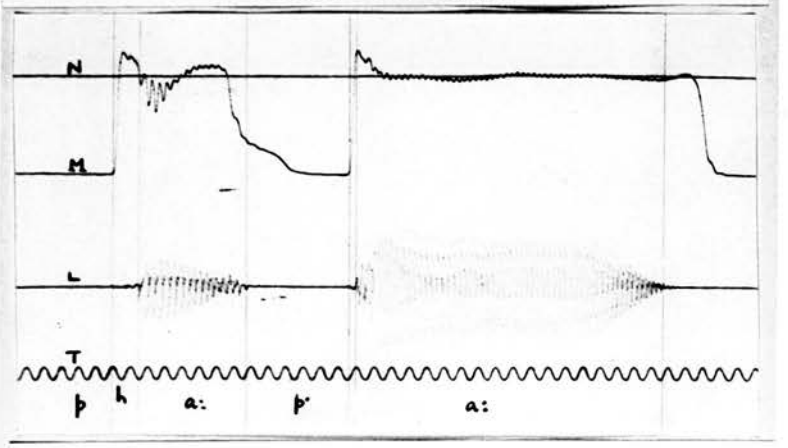
Kgm. 20 [pʼa:tʂá] (song)

Word-medial [a:] followed by a voiceless consonant



Kgm. 21 [pʼapʼa:] (child)

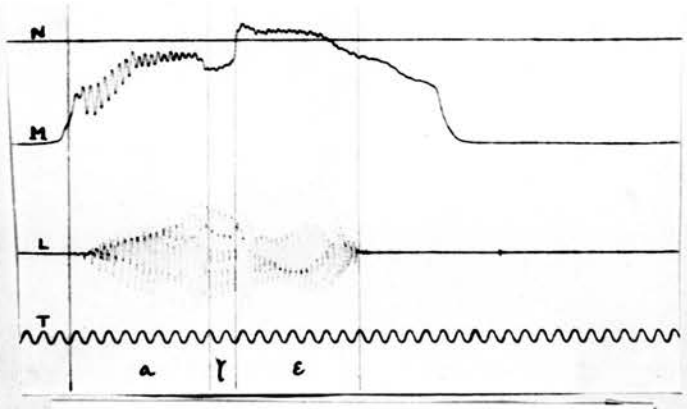
Word-final [a:] — non-vocative



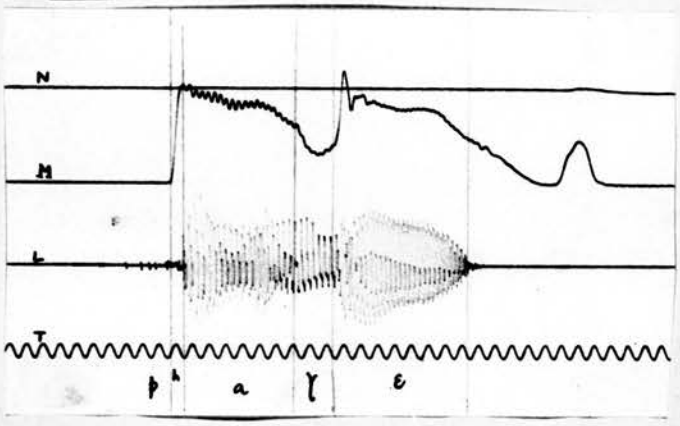
Kgm. 22 [pʼapʼa:] (child! -Voc.)

Word-final [a:] — vocative

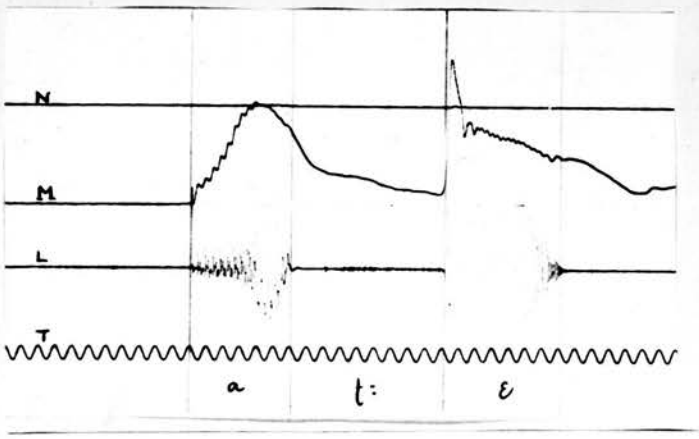
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 23 [aɣɛ] (a kind of cake)
Word-initial followed by a voiced consonant

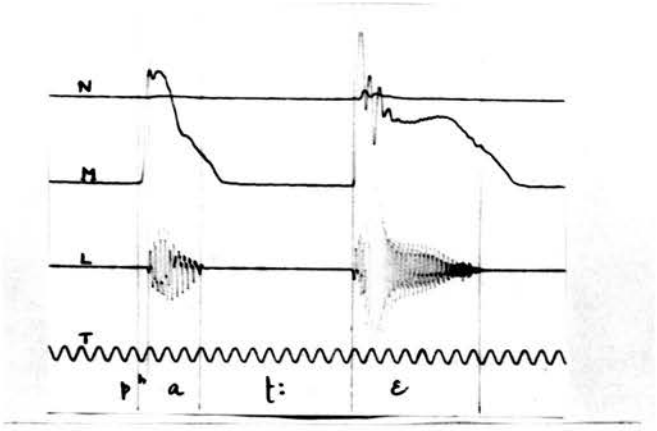


Kgm. 24 [pʰaɣɛ](troops)
Word-medial followed by a voiced consonant

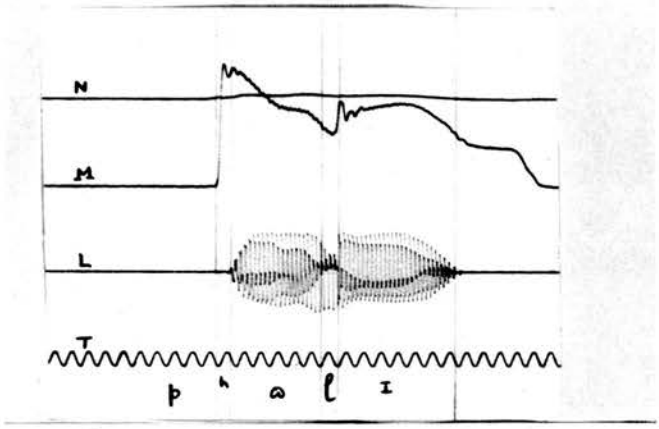


Kgm. 25 [atːɛ] (cardboard)
Word-initial followed by a voiceless consonant

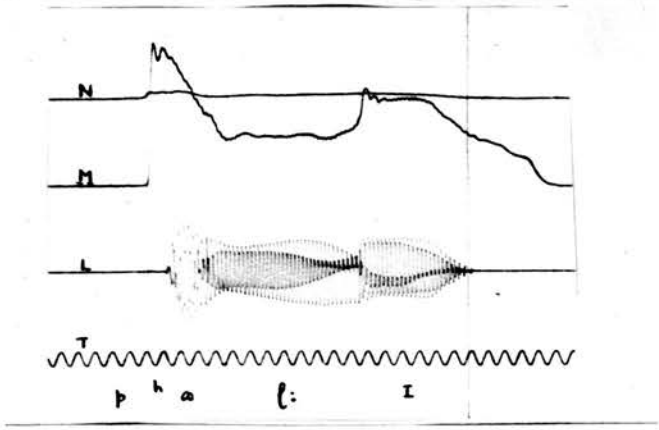
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 26 [pʻaʈ-ɛ] (bark of a tree)
Word-medial followed by a voiceless consonant



Kgm. 27 [pʻaɭɪ] (tamarind)
Word-medial followed by a short consonant



Kgm. 28 [pʻaɭ:ɪ] (a dot)
Word-medial followed by a long consonant

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

4.2.8 The duration of the vowels [ɑ:], [ɑ] and [ɒ] (which are illustrated above) is tabulated below:-

Table 8:-

vowel	duration in m/secs.							
	Initial followed by a voiced consonant	medial followed by a voiced consonant	Initial followed by a voiceless consonant	medial followed by a voiceless consonant	Final non-vocative	Final vocative	medial followed by a short consonant	medial followed by a long consonant
[ɑ:]	320	265	210	155	145	360	-	-
[ɑ]	170	135	120	60	-	-	-	-
[ɒ]	-	-	-	-	-	-	110	55

4.2.9 From the kymograms made it was observed that what has been said about the length of [ɑ:] and [ɑ] in the preceding pages and illustrated above with a duration table is true of all the vowels in the dialect. So in each 'long' vowel we observe various degrees of length and similarly in each 'short' vowel.

4.3 Nasalization of Vowels:-

4.3.1 In the dialect under survey there are nasalized vowels as distinct from the oral vowels described in the foregoing pages. In fact some of the nasalized vowels are phonemically distinct from their corresponding oral vowels. Apart from these phonemically distinct nasalized vowels, oral vowels are nasalized under the influence of adjacent nasal consonants. These vowels are called nasalized vowels in this thesis and in order to distinguish between this accidental nasalization of oral vowels and the essential nasalization of vowels, those vowels which are essentially nasalized are called nasal vowels in this thesis. The nasal vowels are discussed later (see 4.4) The nasalized oral vowels are taken up for discussion here.

4.3.2 An oral vowel can be flanked on either side by nasal consonants as in [mɑ:mɑ:] (maternal uncle) and [nɑɳɖɨ] (crab) or it can have a nasal consonant on on one side of it as in [nɑt̪:ɛ] (snail) and [ɷmɪ] (husk).

4.3.3 To check the nasalization of oral vowels, words with vowels in the following nasal environments were chosen and kymograms were made of the words:

(a) NVN - a vowel with a nasal consonant on either side of it.

(b) VNV - a nasal consonant with a vowel on either side of it.

(c) VNP - a vowel with a nasal consonant plus a stop consonant following it.

(d) NVC - a word-initial nasal consonant immediately followed by a vowel and another consonant.

(e) - NPV a word-final vowel immediately preceded by a nasal consonant plus a homorganic stop consonant group.

(f) - NV a word-final vowel immediately preceded by a nasal consonant.

4.3.4 These kymograms were studied carefully and it was found that:-

(i) vowels with nasal consonants on either side of them are very heavily nasalized. Thus the first vowels in the words [mɑ:mɑ:] (maternal uncle), [mɑ:mɪ] (maternal aunt), [noɳɖɪ] (lame person), [nɑɳɖɨ] (crab) are very heavily nasalized. (see kymograms 29-31).

(ii) In disyllabic words of the pattern NV-NV or NVN-NV [21] even the word-final vowel is nasalized. In other words, the soft palate that is lowered for the articulation of the word-initial nasal consonant remains lowered till the utterance is completed. Thus in words like [maŋɪ] (bell), [nam:ə] (our), [maŋ:ɨ] (mud), [man:ɪ] (elder sister-in-law), etc., even the word-final [ɪ], [ə], [ɨ] and [ɪ] respectively, are nasalized. (see kymograms 29-34).

(iii) With words in which a nasal consonant has a vowel on either side of it, an interesting phenomenon was observed. If the words are disyllabic words of the structure V-NV or VN-NV, both the vowels in the word - i.e., the vowels on either side of the nasal consonant - are nasalized. If, however, the word is a disyllabic word of the structure CVN-NV (C standing for any consonant other than a nasal consonant) the second vowel in the word alone is nasalized. For example, in the words [ɷmɪ] (husk) and [ɑm:ɪ] (grinding stone), both the vowels in each word are nasalized. On the other hand, in the words [p'ɑn:ɪ] (pig) and [k'ɑŋ:ɨ] (eye), the final vowel in each word alone is nasalized. (see kymograms 38-43).

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21. N stands for a nasal consonant and V for a vowel. The hyphen indicates syllable boundary.

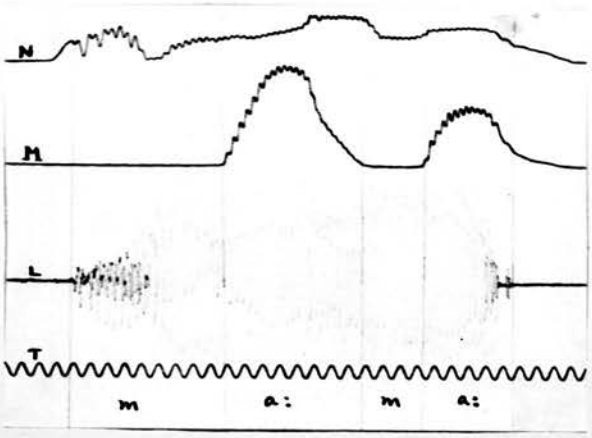
(iv) Words in which there are two syllables of the structures CVN-CV and VN-CV were examined next. It was found that the final V in neither of the cases referred to above is nasalized. But the V in the first syllable was found to be nasalized only in the second of the two categories referred to above. The V in the first syllable in the first category, being preceded by a non-nasal consonant, is not nasalized. Thus in words like [ʈ'ambɪ] (younger brother), [p'ondo] (hole), [ɒaɳɖɛ] (fight-n.), [ʈ'aŋgɛ] (younger sister), [k'ombo] (horn), [p'u:ɳɖo] (garlic) and so on, neither of the two vowels in each word is nasalized. In words like [anbɨ] (love), [ambɨ] (arrow), [ɪndə] (this), [andə] (that), etc., the word-final vowels are not nasalized, whereas the vowels in the first syllables are nasalized. (see kymograms 44-48).

(v) In disyllabic words of the structure NV-CV, the final V - the word-final vowel - is not nasalized. The first vowel in the word - i.e., the nucleus of the first syllable - is negligibly nasalized if the immediately following consonant - i.e., the releasing consonant of the second syllable - is a stop consonant. It is nasalized slightly if the immediately following consonant - i.e., the releasing consonant of the second syllable - is a non-stop consonant. Thus in words like [naʈ:ɛ]

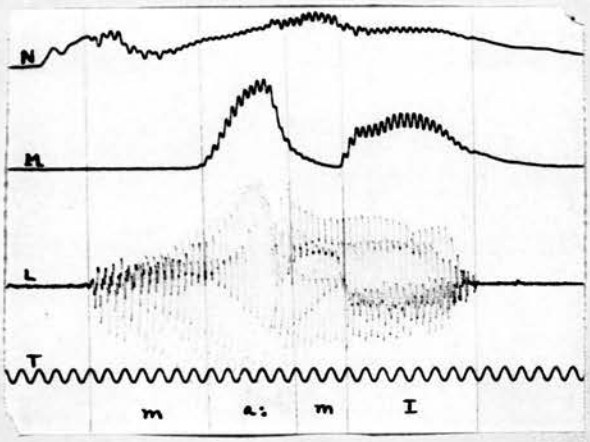
(snail), [na:k'i̯] (tongue), [map:i̯] (clouds), etc., the word-final vowels are not nasalized and the word-medial ones are negligibly nasalized. But in words like [mo:ro] (buttermilk), [na:li̯] (four), [naɾɪ] (fox), and [mu:lɛ] (corner), the word-final vowels are not nasalized and the medial ones are slightly nasalized. (see kymograms 49-52)

4.3.5 A few of the kymograms made to check this phenomenon are reproduced in the next few pages. The kymograms have been roughly segmented. The nasal tracing (top line marked N on every kymogram reproduced) corresponding to the vowel(s) in question indicates the presence or absence of nasalization. Nasalization is clearly indicated by regular wave forms on the nasal tracing corresponding to the vowel(s).

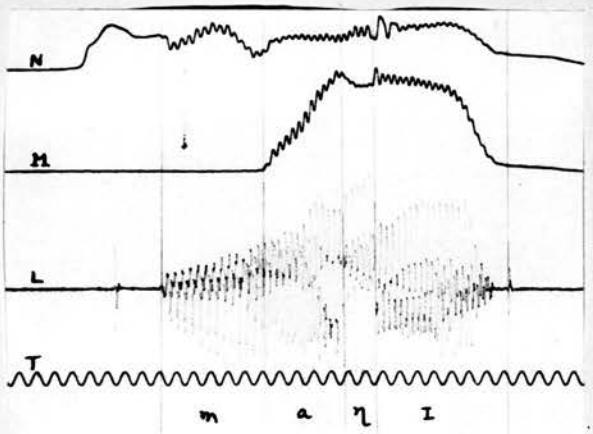
4.3.6 The I.P.A. nasalization symbol [~] has not been used to transcribe any of these nasalized vowels - i.e., the oral vowels which are nasalized accidentally owing to the influence of the adjacent nasal consonants. The symbol [~] is used only to transcribe those vowels which are essentially nasalized. These are called nasal vowels and these are described in the following section (see 4.4).



Kgm. 29 [maːmaː] (maternal uncle)



Kgm. 30 [maːmɪ] (maternal aunt)

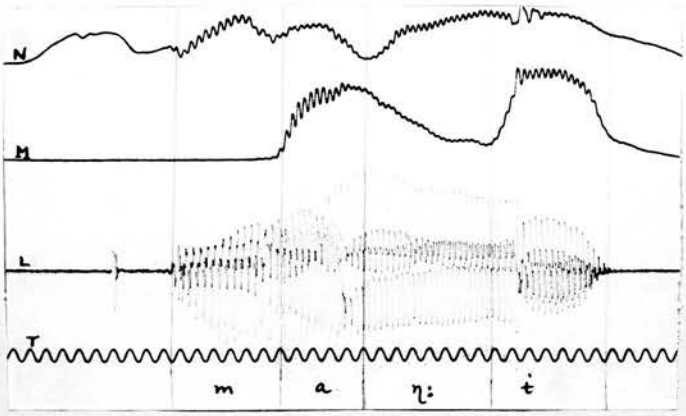


Kgm. 31 [maŋɪ] (bell)

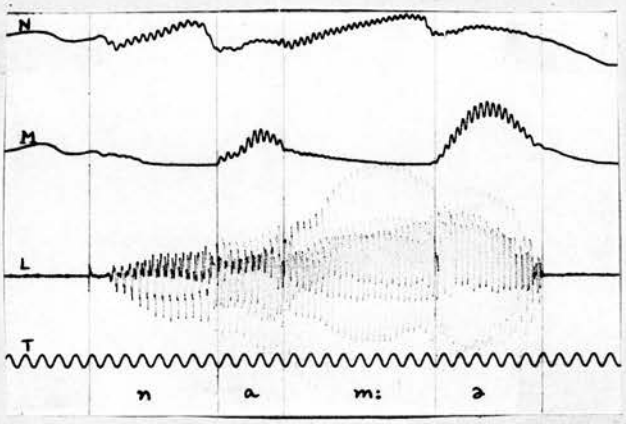
Disyllabic words of the structure NV-NV

Both vowels are nasalised

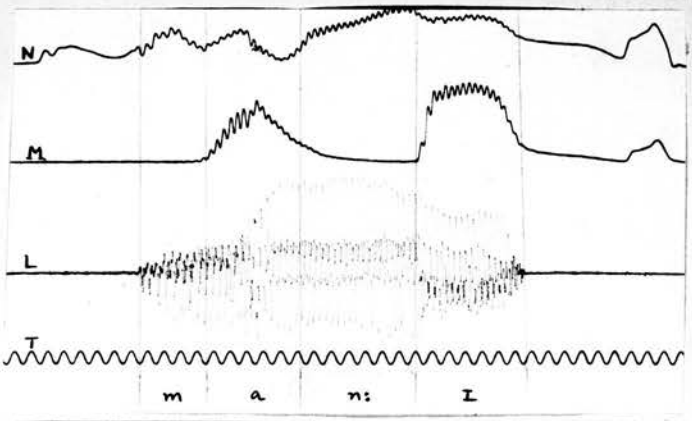
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 32 [maŋ:ɨ] (mud)



Kgm. 33 [nam:ə] (our)

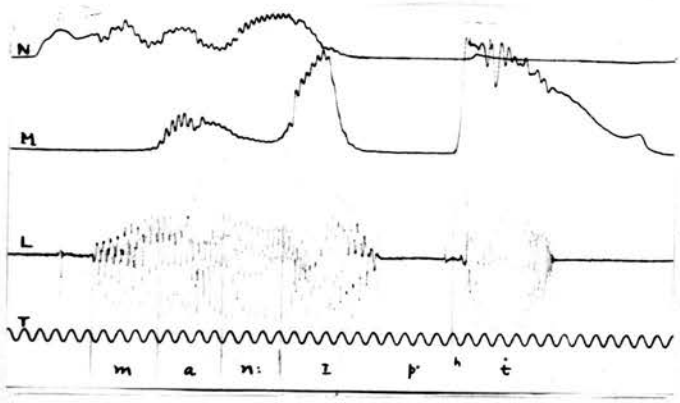


Kgm. 34 [man:I] (elder sister-in-law)

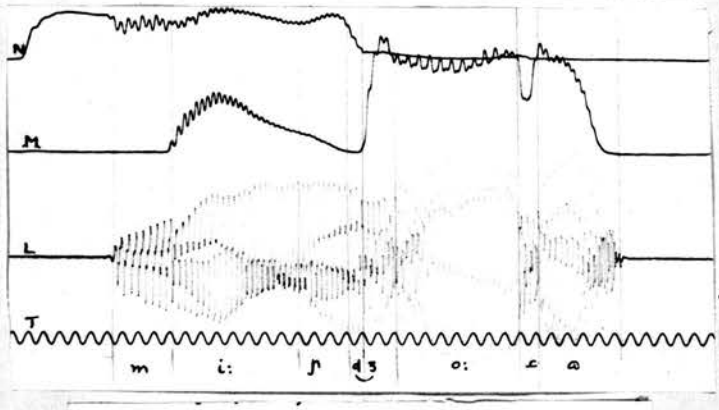
Disyllabic words of the structure NVN-CV

Both vowels are nasalised

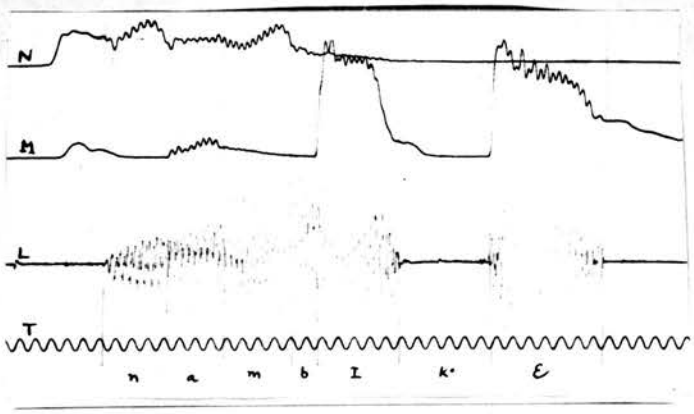
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 35 [man:ɪp·ɨ] (forgiveness)
Trisyllabic word of the structure NVN-NV-CV
The vowels in the first and second syllables are nasalised

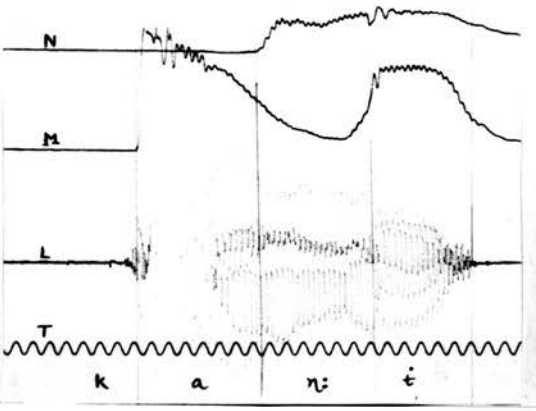


Kgm. 36 [mi:ɲʤo:ɛa] (a kind of rat)
Trisyllabic word of the structure NVN-CV-CV
The vowel in the first syllable alone is nasalised

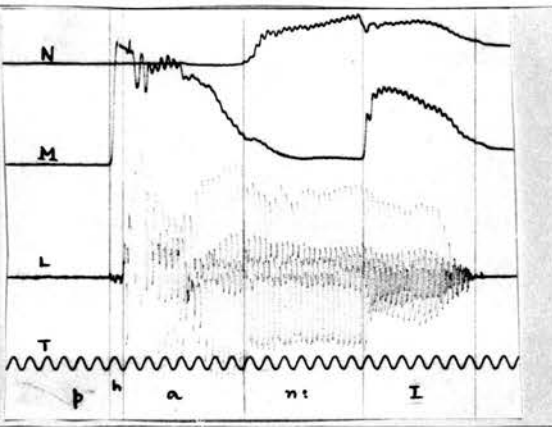


Kgm. 37 [nambɪk·ɛ] (belief)
Trisyllabic word of the structure NVN-CV-CV
The vowel in the first syllable alone is nasalised

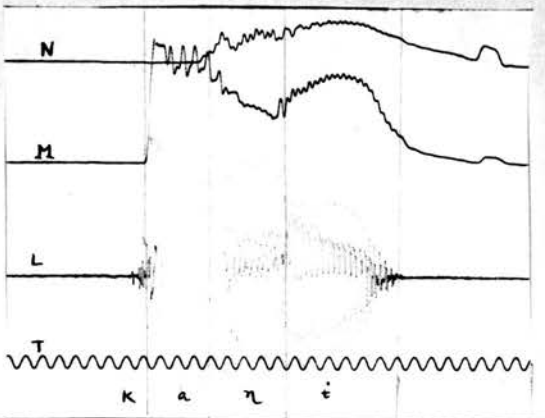
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 38 [kâŋːi] (eye)
Disyllabic word of the structure CVN-NV
The vowel in the second syllable alone is nasalised

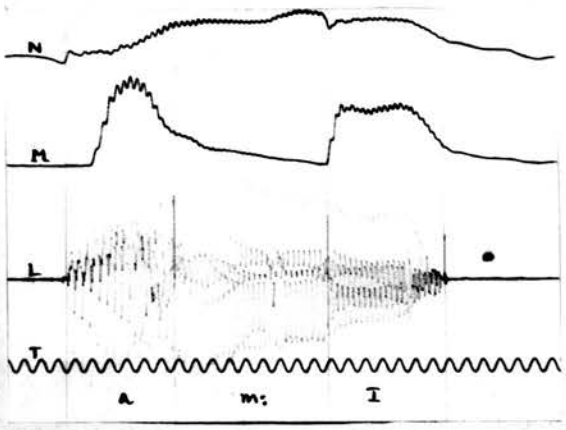


Kgm. 39 [pânːi] (pig)
Disyllabic word of the structure CVN-NV
The vowel in the second syllable alone is nasalised

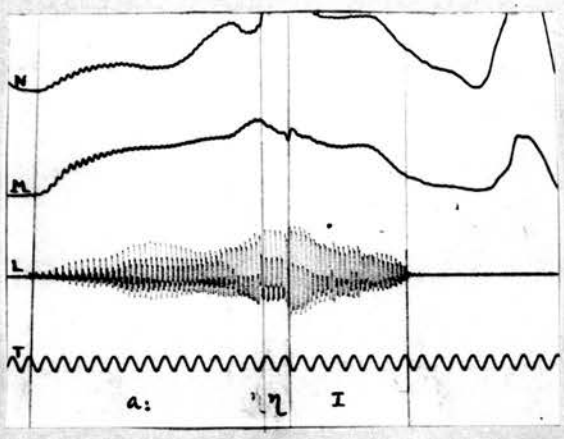


Kgm. 40 [k'aŋi] (node)
Disyllabic word of the structure CV-NV
The vowel in the second syllable alone is nasalised

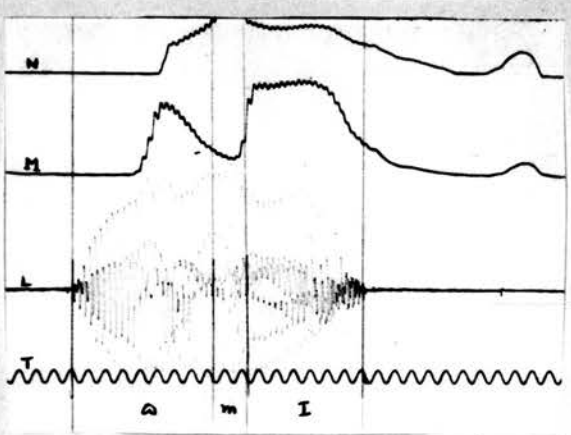
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 41 [aːmːɪ] (grinding stone)



Kgm. 42 [aːŋɪ] (nail)

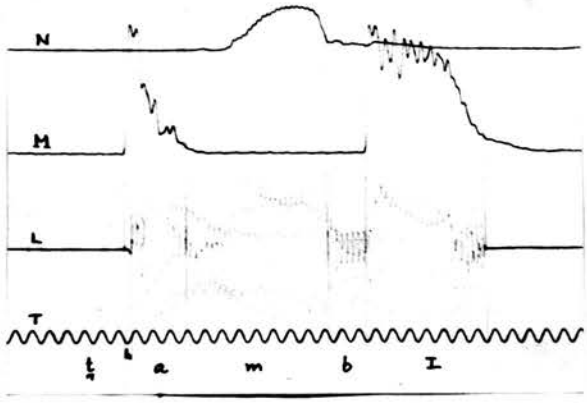


Kgm. 43 [ãmɪ] (husk)

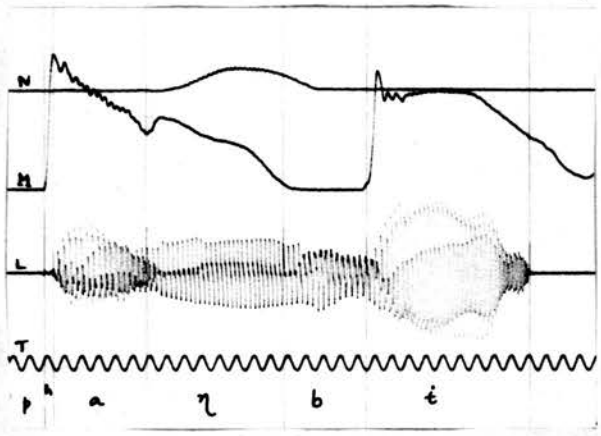
Disyllabic words of the structure VN-NV or V-NV

Both vowels are nasalised

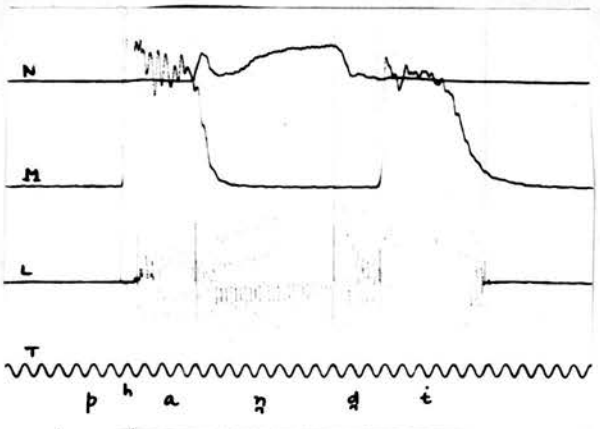
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 44 [t̪ʰ-mbɪ] (younger brother)



Kgm. 45 [pʰaŋbi] (culture)

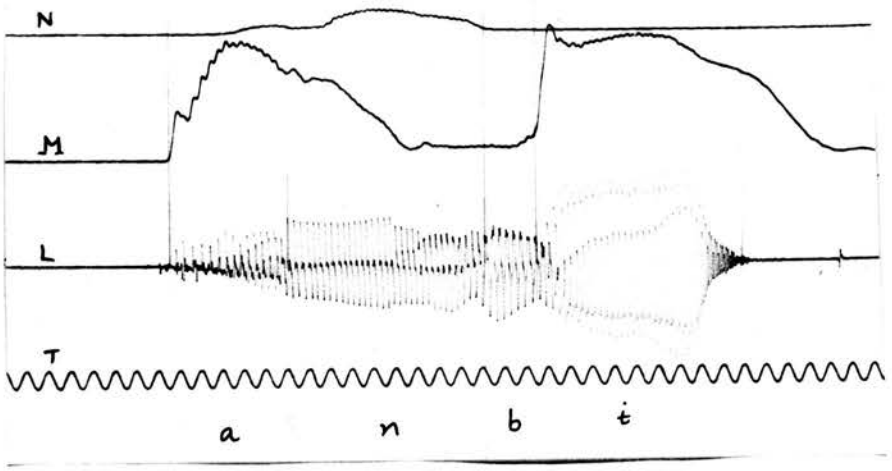


Kgm. 46 [pʰaŋ̈d̪i] (ball)

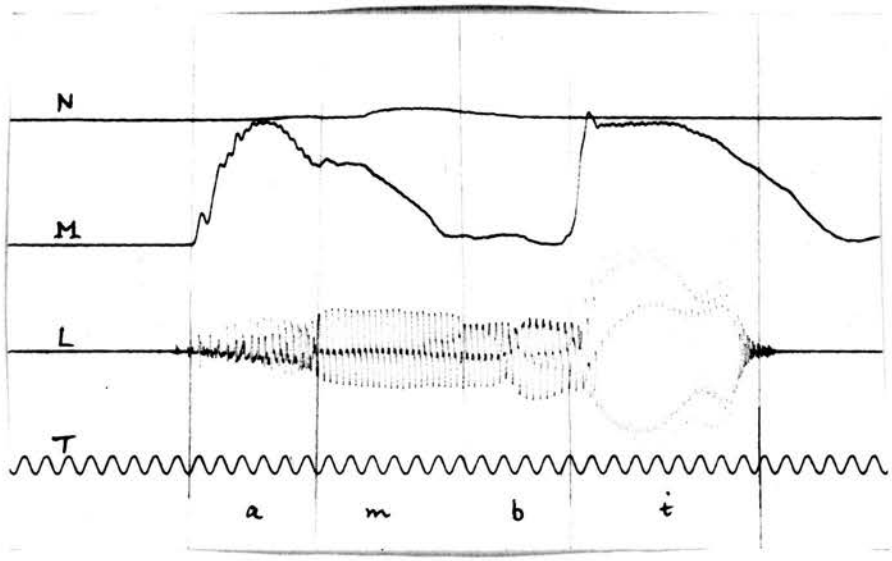
Disyllabic words of the structure CVN-CV

Neither of the vowels is nasalised

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 47 [anbí] (love)

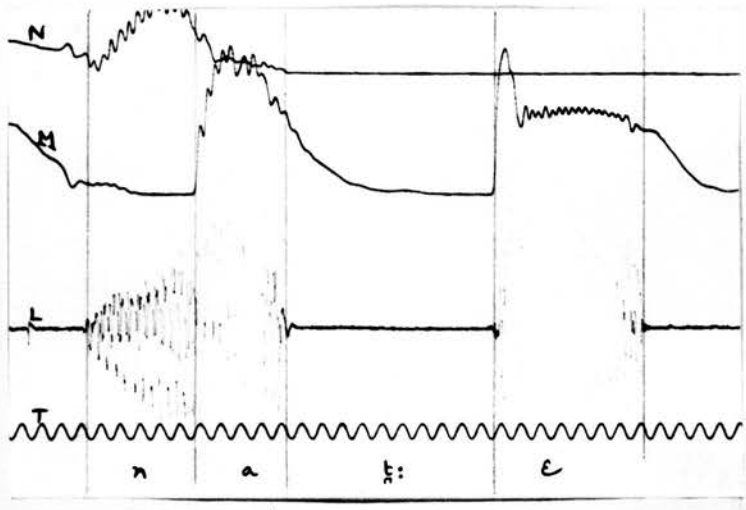


Kgm. 48 [ambí] (arrow)

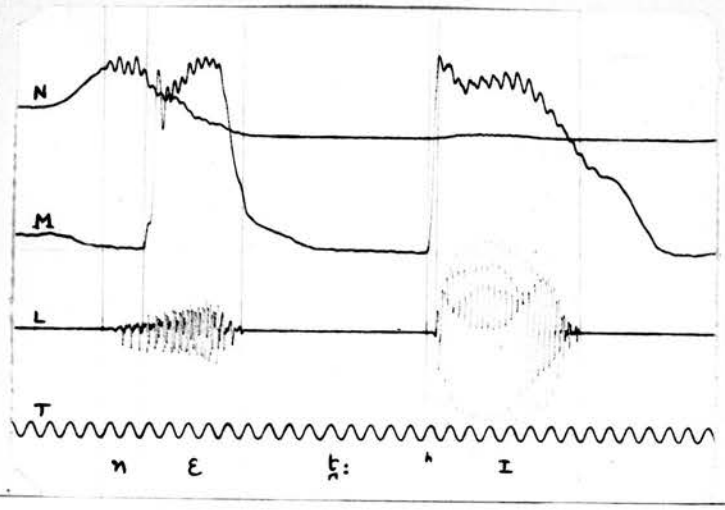
Disyllabic words of the structure VN-CV

Vowels in the first syllables are slightly nasalised

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 49 [naʈːɛ] (snail)

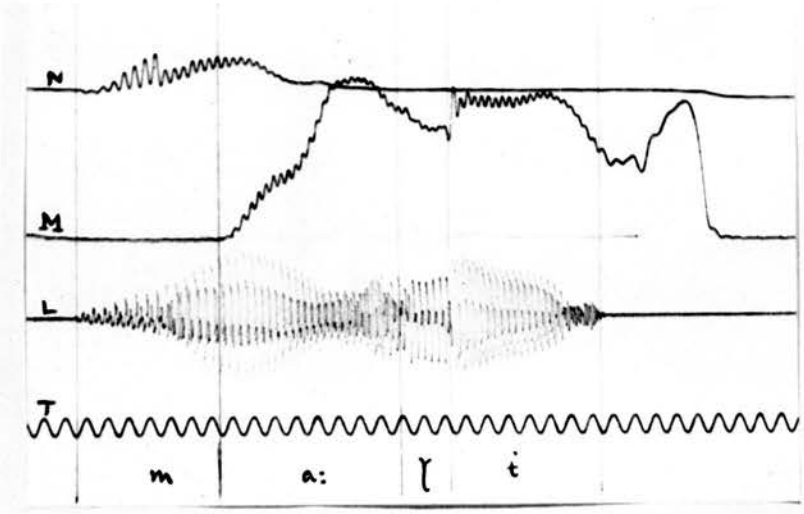


Kgm. 50 [nɛʈːɪ] (forehead)

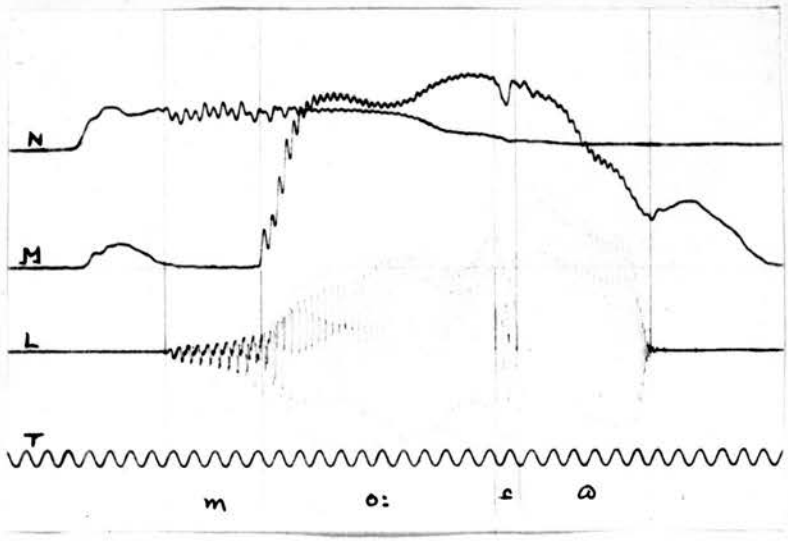
Disyllabic words of the structure NV-CV

Vowels in the first syllables are negligibly nasalised, while those in the second syllables are not nasalised at all.

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 51 [ma:ɾt] (cow)



Kgm. 52 [mo:ɾɑ] (buttermilk)

Disyllabic words of the structure NV-CV

Vowels in the first syllables are slightly nasalised, while those in the second syllables are not nasalised at all.

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

4.4 PURE VOWELS - NASAL.

4.4.1 In the dialect of Tamil under survey, there are nasal vowels distinct from the nasalized vowels discussed in the previous section. On the basis of the spectrographic analysis conducted during the course of the present research, these nasal vowels are transcribed [ɐ̃:], [ɛ̃], [ɑ̃:], [ʌ̃], [ɯ̃] and [ɔ̃] in this thesis. The nasalized vowels discussed in the previous section are oral vowels during the articulation of which the soft palate is lowered to accommodate the articulation of an immediately following nasal consonant. Or, the soft palate which was lowered during the articulation of a nasal consonant immediately preceding the vowel in question is not raised completely so that the nasal passage of air is still partially open during the vowel articulation. The result is that the air that is compressed by pressure from the lungs escapes through the mouth and through the nose simultaneously, giving the vowel a nasal twang which may be distinctly perceptible or hardly so, depending upon the extent to which the soft palate is raised or lowered during the vowel articulation.

4.4.2 Apart from these, there are six nasal vowel phones - we term them "nasal vowels" to distinguish them from the nasalized vowels discussed above. These are always word-final - they never occur in any other

position. The words in which they occur are those in which there is an orthographic word-final nasal consonant. In the formal/literary dialect of Tamil the word-final nasal consonant is pronounced. But in most of the colloquial varieties of Tamil the [V+N] of formal Tamil is just [Ṽ]. A few examples will illustrate this point. The examples are given in orthography, in the formal dialect and in the present writer's colloquial speech.

orthography	formal Tamil	colloquial Tamil	gloss
paṭam	[p'aɽam]	[p'aɽã]	picture
vanta:n	[ʋanda:n]	[ʋandã:]	he came
vante:n	[ʋande:n]	[ʋandɛ̃]	I came
varum	[ʋarɨm]	[ʋarw̃]	It'll come

4.4.3 Of the six nasal vowel phones, two contrast with their oral counterparts in minimal pairs. The other four occur in a few words each. To check the quality of these vowels a few spectrograms were made of words with these nasal vowels. These spectrograms were studied carefully, bearing in mind what acoustic phoneticians have said about the phenomenon of nasalization of vowels. A few of these are briefly discussed below:

4.4.4 Hockett(1955) points out that "the acoustic correlates of nasalization are not so clear".[22]

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22. Hockett, C.F. (1955

Moser, Dreher and Adler (1955) say that extra resonances are added to the vowel spectrum owing to nasalization but that the location of the extra resonances is undecided. Fant (1960) observes: "Nasalization is not an easy feature to study ... since the acoustic characteristics vary both with speaker and with the particular sound upon which the nasalization is superimposed and with the type of and degree of nasal coupling".[23] Joos (1948) points out that in nasalized vowels there is an extra resonance close above formant 1, which he calls formant 1n. He also points out that extra formants occur between all regular vowel formants. Smith (1951), Delattre (1954), House and Stevens (1956), Hattori, Yamamotto and Fujimura (1956) - all have studied spectrograms of nasalized vowels and published their findings. A very brief summary of the findings of these acousticians is given below:

(a) F_1 is mostly weakened

(b) A formant appears at 1000 cps.

(c) F_2 is often weakened and raised a little

(d) F_3 is weakened and lowered

(e) F_1 has an increased band width

(f) The overall level of the vowel is reduced

(g) F_3 is eliminated

(h) There are irregularities in the upper formants

(i) There are possibly additional spectral peaks.

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23. Fant, G. (1960, 149).

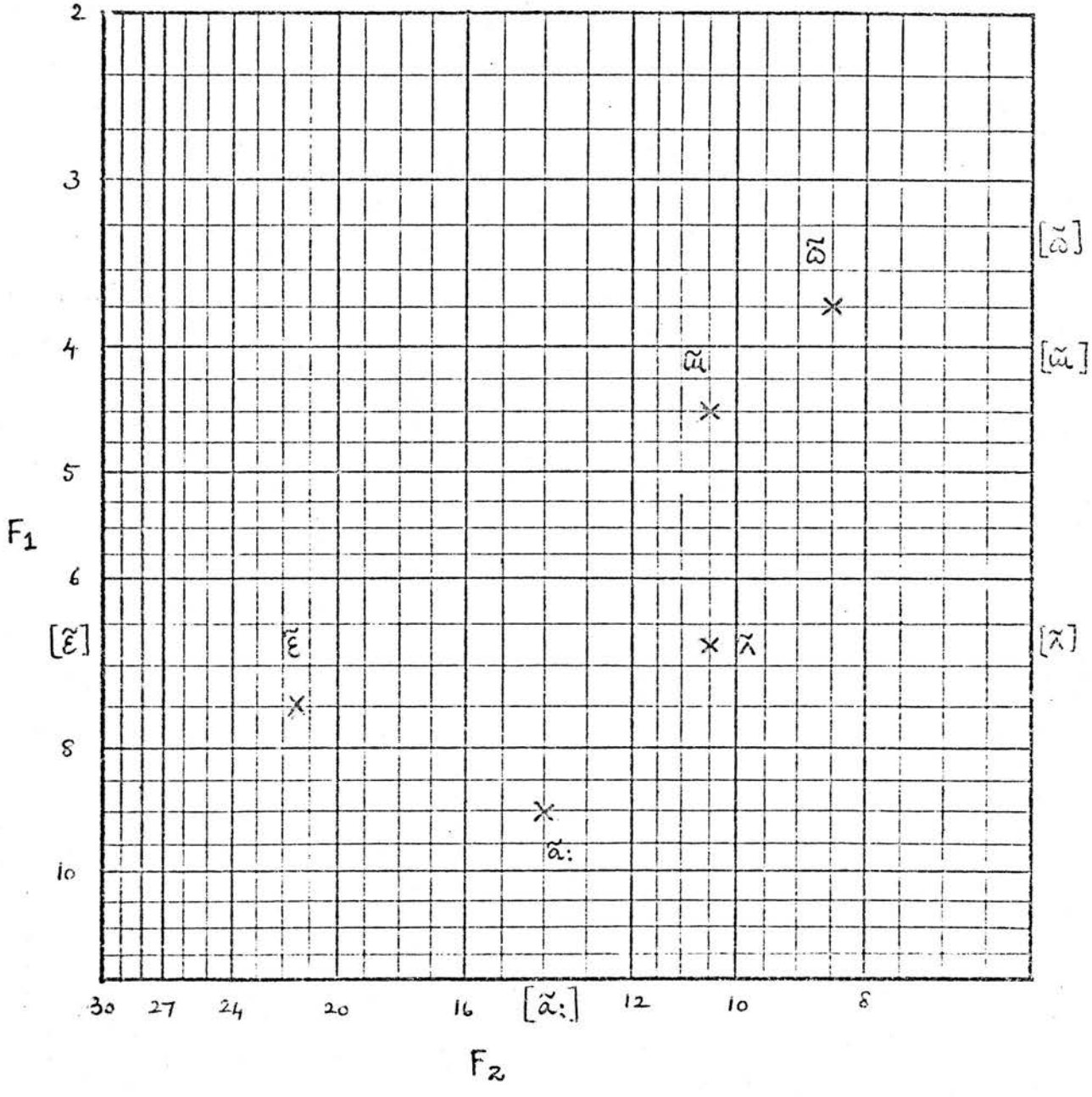
4.4.6 The spectrograms of nasal vowels made for purposes of this research were studied bearing in mind the findings of the authors cited on the previous page. One very striking feature that was observed on all spectrograms was the increased band width of F_1. This is probably because of the fusion of F_1 and what Joos (1948) calls formant 1n. In other words, the first formant of the vowel and the extra resonance that appears above this formant are fused and thus the F_1 has an increased band width. Some of the spectrograms of nasal vowels, when compared with their corresponding oral vowels, revealed that the second formants of the nasal vowels were slightly raised. In certain other spectrograms, the third formant of the nasal vowel could not be located at all. (see spectrograms 44, 46, 48 and 50). Some oral vowels, when nasalized, were found to have different vowel quality. Thus <u>varu</u> (fry - imp.) is [ʋaɾɨ] in speech; <u>varum</u> (it will come)is [ʋaɾ̃ũ] in speech. But in all the spectrograms it was found that the first formant of the nasal vowels was not appreciably weakened in comparison with the first formant of their corresponding oral vowels.

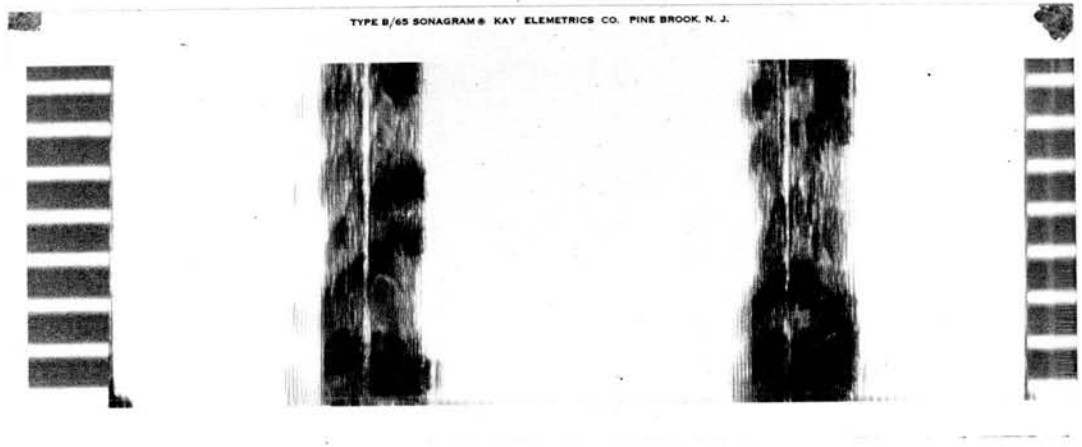
4.4.7 The first and second ~~vowels~~ formants of these nasal vowels were calculated from the spectrograms and they were plotted on a logarithmic graph sheet. The Table on the next page shows the average values of F_1 and F_2 calculated from several spectrograms.

Table 9:-

word used	nasal vowel	F_1	F_2
[ɪɾɨkˈ$\tilde{\text{ɯ}}$] (It will be)	[$\tilde{\text{ɯ}}$]	450	1050
[pʻɑːt̪ˈ$\tilde{\varepsilon}$] (I saw)	[$\tilde{\varepsilon}$]	750	2150
[pʻɑːt̪ˈ$\tilde{\text{ɑ}}$ː] (he saw)	[$\tilde{\text{ɑ}}$ː]	900	1400
[ɑpːÃ] (a cake)	[Ã]	675	1050
[pʻoːɾ$\tilde{\text{o}}$] (enough)	[$\tilde{\text{o}}$]	375	850

These frequencies were plotted on a logarithmic graph sheet which is reproduced on the next page. Following the graph are a few selected spectrograms.


2
3
4
5
6
8
10
F1
[ɛ̃]
[ɑ̃:]
[œ̃]
[ɔ̃]
[ɔ̃]
ɛ̃
œ̃
ɔ̃
ɑ̃:
ɔ̃
30 27 24 20 16 [ɑ̃:] 12 10 8
F2

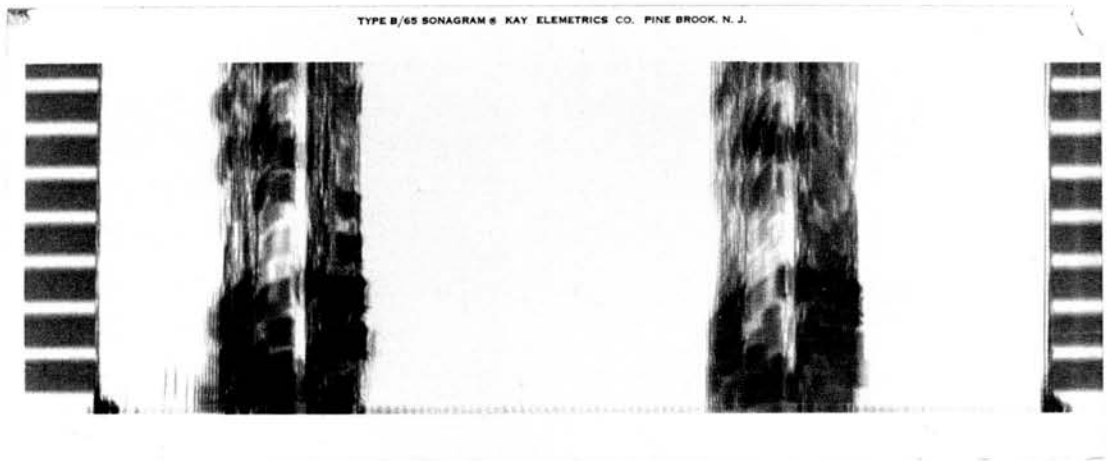


Sgm. 43 [ʁaʀi] (fry-imp.)

Sgm. 44 [ʁaʀ̃] (it will come)

Sgm. 45 [p'o:ˌ·t] (you put)

Sgm. 46 [p'o:ˌ·t̃] (I put)



Sgm. 47 [wɑ̃da:] (she came)

Sgm. 48 [wɑ̃dɛ̃:] (he came)

Sgm. 49 [mare] (forget-imp.)

Sgm. 50 [marX] (tree)

4.4.8 Description and distribution of the nasal vowels:-

4.4.9 Number 1 [ɛ̃]

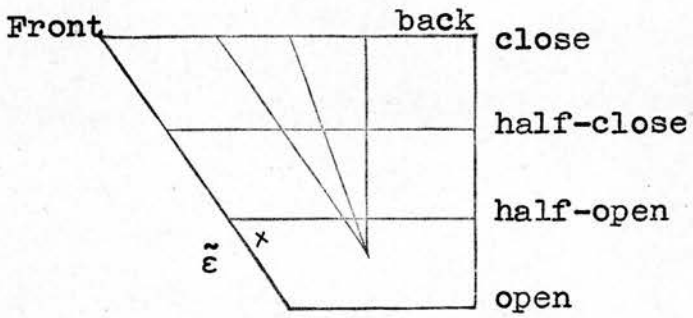
height of the tongue: between half-open and open, but nearer half-open.

part of the tongue that is highest: the hinder part of the 'front'

position of lips: medium

position of the soft-palate: lowered

opening between the jaws: medium [24]



4.4.10 Distribution:- [ɛ̃] occurs only in word-final position

[ʋaɾɛ̃] (I am coming)

[pʻoːnɛ̃] (I went)

[pʻaːt̪ʻɛ̃] (I saw)

[kʻəːʈʻɛ̃] (I asked)

---

24. All the nasal vowels are fully voiced and hence the state of the glottis is not mentioned in individual descriptions of nasal vowels.

4.4.11 Number 2 [ã:]

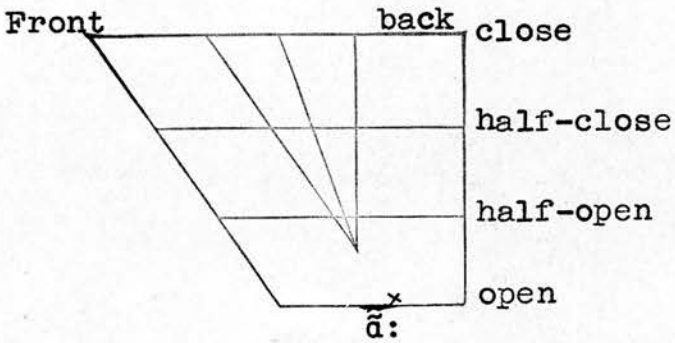
height of the tongue: fully open

part of the tongue that is highest: the part in advance of the 'back'.

position of lips: medium

position of the soft-palate: lowered

opening between the jaws: very wide



4.4.12 Distribution:- [ã:] occurs only in word-final position.

[ʋaɾã:]	(he is coming)
[pʻo:ɾã:]	(he is going)
[pʻu:ɾã:]	(centipede)
[kʻaɾəjã:]	(white ant)
[ʋaɳ:ã:]	(washerman)
[t̪ʻaʈ:ã:]	(goldsmith)

4.4.13 Number 3 [ɐ̃]

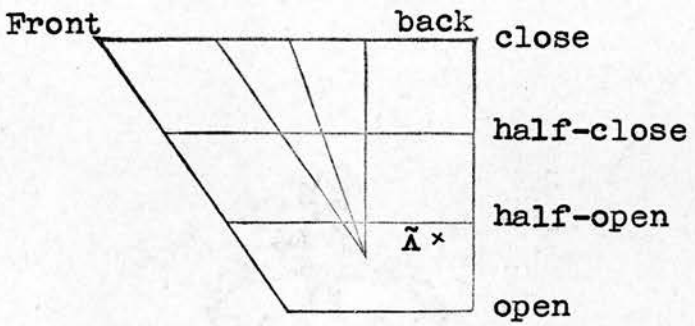
height of the tongue: half open

part of the tongue that is highest: the 'back'

position of lips: spread

position of the soft-palate: lowered

opening between the jaws: medium



4.4.14 Distribution:- [ɐ̃] occurs only finally in a word. [ɐ̃] occurs more frequently than any other nasal vowel.

[ɑp:ɐ̃]	(a kind of cake)
[pʻɑɽɐ̃]	(picture)
[mɑɾɐ̃]	(tree)
[pʻɑʈ:ɐ̃]	(paper-kite)
[ɑʊɐ̃]	(he)
[kʻɑʈˑəɽɐ̃]	(building)

4.4.15 Number 4 [ɯ̃]

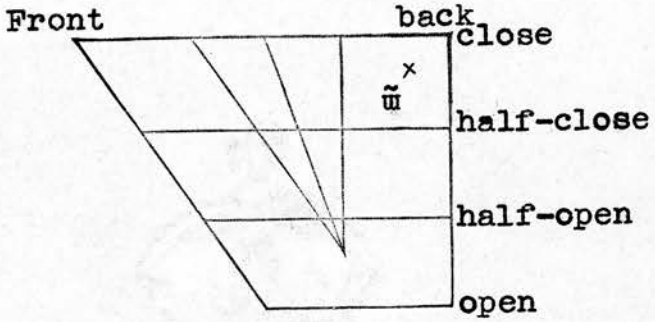
height of the tongue: near close

part of the tongue that is highest: the 'back'

position of lips: spread

position of the soft palate: lowered

opening between the jaws: medium



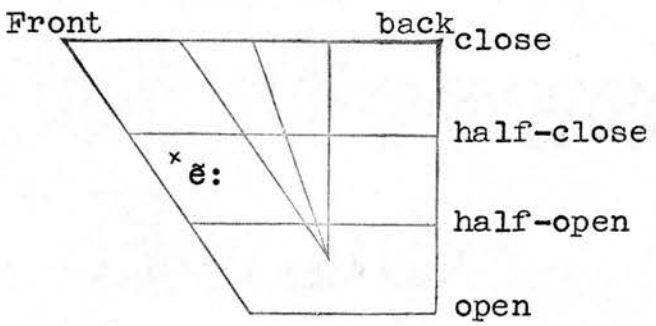
4.4.16 Distribution:- [ɯ̃] occurs only finally in a word

[ʋaɾɯ̃]	(It will come)
[t̪ʻɛɾɪjɯ̃]	(someone knows)
[ɪɾɨkʻɯ̃]	(It will be)

The four nasal vowels described above are the more frequently occurring ones. There are two others, which occur less frequently. These are described below.

4.4.17 Number 5 [ẽ:]

height of the tongue:	between half-close and half-open, but nearer half-close
part of the tongue that is highest:	the 'front'
position of lips:	spread
position of the soft palate:	lowered
opening between the jaws:	medium



4.4.18 Distribution:- In the present writer's speech [ẽ:] occurs only in one single word.

[jẽ:] (why?)

4.4.19 Number 6 [ɷ̃]

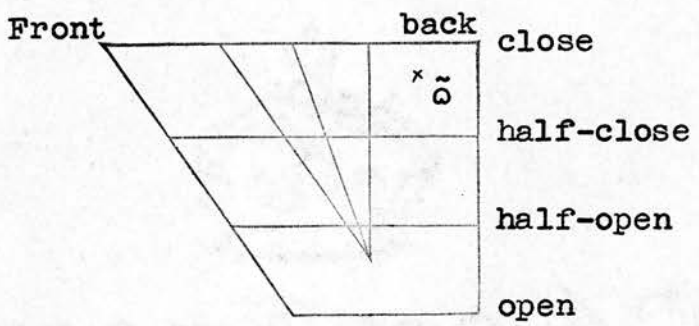
height of the tongue: between half-close and close, but nearer close

part of the tongue that is highest: the 'back'

position of lips: close lip-rounding

position of the soft palate: lowered

opening between the jaws: medium



4.4.20 Distribution:- [ɷ̃] occurs only in one word in the present writer's speech.

[pʻo:rɷ̃] (enough)

In addition to this, words ending with [ɷ], when the morpheme um (and) is added to them, are pronounced [---ɷ̃]. A few examples are given below:-

[pʻu:ʈˑɷ̃] (lock and ...)

[su:ʈˑɷŋgo:ʈˑɷ̃] (trousers and jacket)

[ɑm:ɑ:ʋɨmboɳ:ɷ̃] (mother and daughter)

4.5 DIPHTHONGS - ORAL

4.5.1 There are two oral diphthongs in the dialect of Tamil under survey. In the articulation of these diphthongs the speech organs "start in the position of one vowel and move in the direction of another vowel" [25] These two diphthongs are transcribed [ɑi] and [ɑo] respectively in this thesis.

4.5.2 To ascertain the quality of the two vowels in a diphthong, spectrograms were made of monosyllables with syllable-final diphthongs and of words with the diphthongs in word-initial, word-medial and word-final positions. The first and second formants of the two vowels in each diphthong are tabulated below. In the Tables below the two vowels in the diphthong are referred to as Target I and Target II respectively.

Table 10:-

4.5.3 Diphthong I

Word or syllable used	F_1		F_2	
	Target I	Target II	Target I	Target II
[p'ɑi] (bag)	750	400	1050	2100
[p'ɑi] (bag)	750	380	1100	2050
[p'ɑi] (bag)	750	375	1100	2050
[t'ɑi] (name of a month)	740	400	1075	2100
[k'ɑi] (hand)	725	400	1075	2075
[mai] (collyrium)	775	380	1100	2125
[ɑijər] (a Brahmin)	740	375	1100	2100

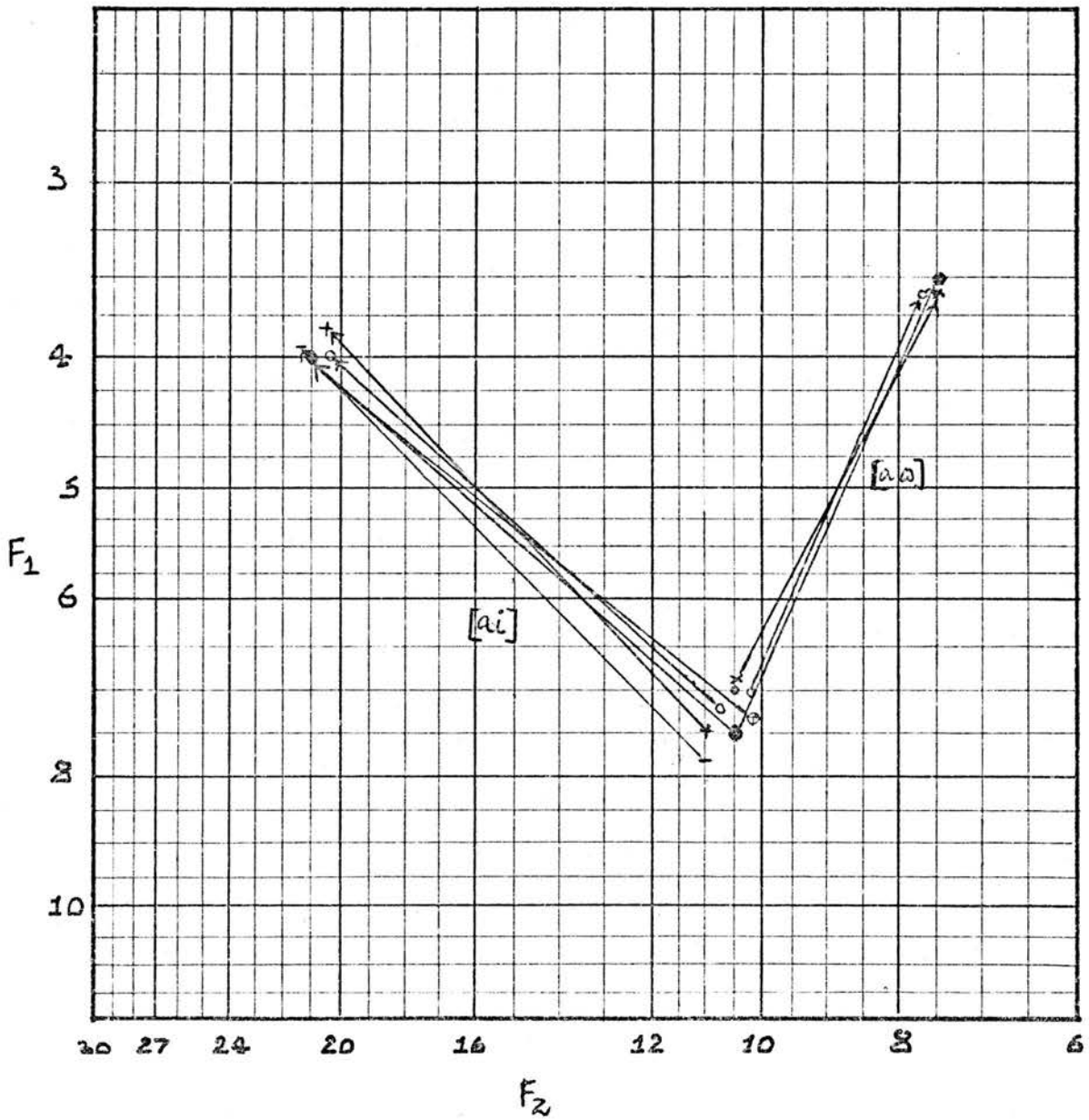
25. Jones, D (1969 ed., 58)

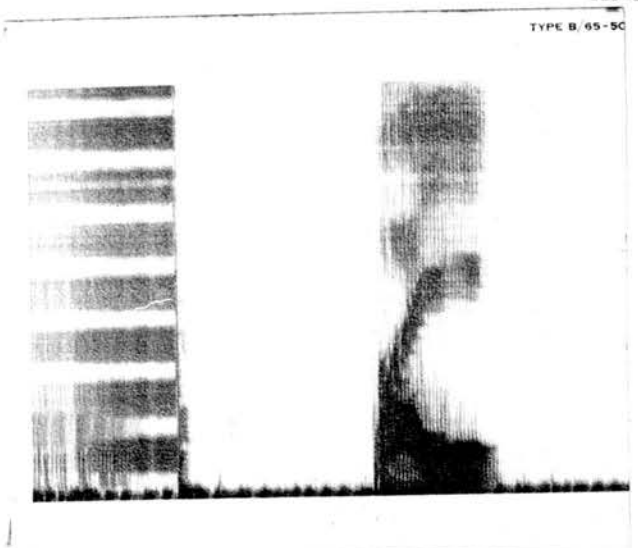
Table 11:-

4.5.4 Diphthong II

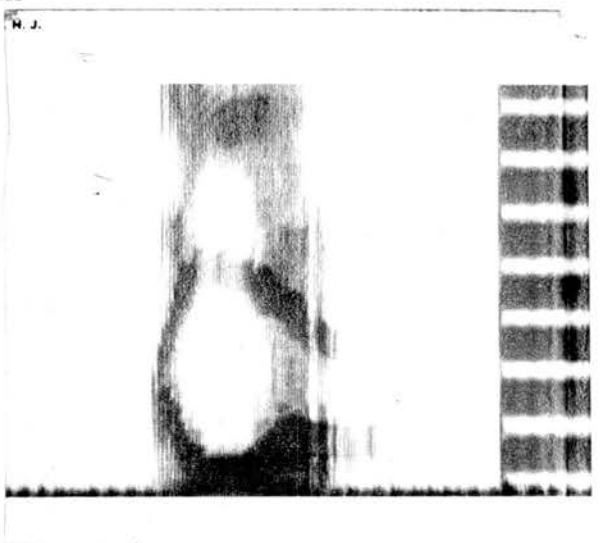
Word or syllable used	F_1		F_2	
	Target I	Target II	Target I	Target II
[p'ɑɷ](name of a letter)	700	350	1100	750
[p'ɑɷ](name of a letter)	690	360	1100	750
[p'ɑɷ](name of a letter)	700	350	1150	750
[t̪'ɑɷ](name of a letter)	750	380	1100	760
[k'ɑɷ](name of a letter)	740	375	1100	760
[mɑɷnÃ](silence)	750	360	1100	760
[ɑɷvɛ](proper name)	700	360	1050	760

4.5.5 The first and second formants of these vowels forming the diphthongs were then plotted on a logarithmic graph sheet. The graph is reproduced on the next page. Immediately after the graph are a few spectrograms from which the formants were calculated.

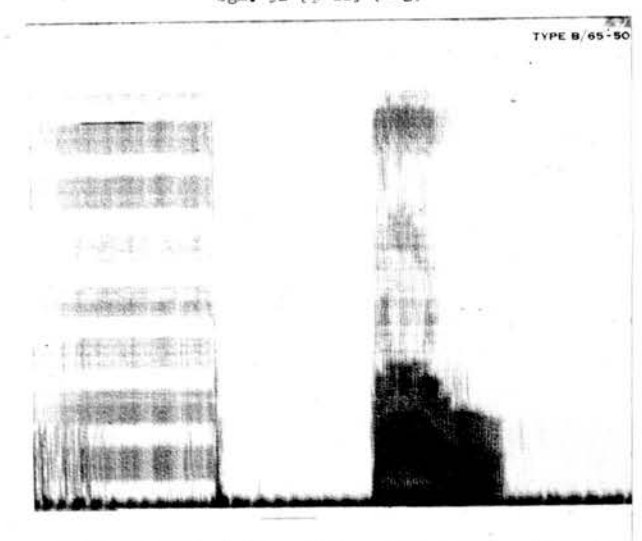

3
4
5
6
8
10
F1
30 27 24 20 16 12 10 8 6
F2
[ai]
[aω]



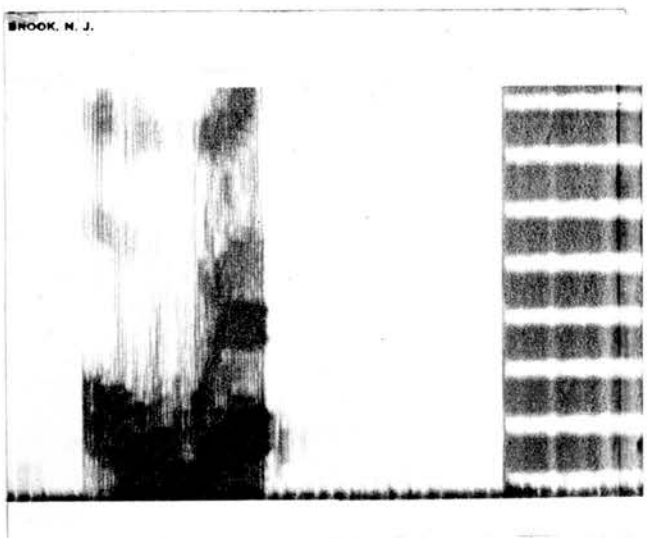
Sgm. 51 [p ɑi] (bag)



Sgm. 52 [ɑijəɾ] (a brahmin)



Sgm. 53 [p ɑo] (name of a letter)



Sgm. 54 [ɑoʋɛ] (proper name)

4.5.6 Lip and jaw positions:-

The lip and jaw positions during the articulation of the diphthongs were ascertained from cine films. Frame-by-frame measurements are given in Appendix II . Life-size measurements are tabulated below:-

Table 13:-

4.5.7 [ai]:-

word used	width of lip opening m.m.		height of lip opening m.m.		distance between the jaws m.m.	
	a	i	a	i	a	i
[p'ai] (bag)	37	40	20	16	60	59
[aijər] (a brahmin)	35	37	20	16	60	56

Table 14:-

4.5.8 [aɷ]

word used	width of lip opening m.m.		height of lip opening m.m.		Protrusion of upper lip m.m.		distance between the jaws m.m.	
	a	ɷ	a	ɷ	a	ɷ	a	ɷ
[p'aɷ](name of a letter)	35	11	17	08	0	04	61	56
[aɷʋɛ](proper name)	36	11	19	08	0	05	61	56

4.5.9 Description and distribution of the diphthongs:-

4.5.10 [ai]

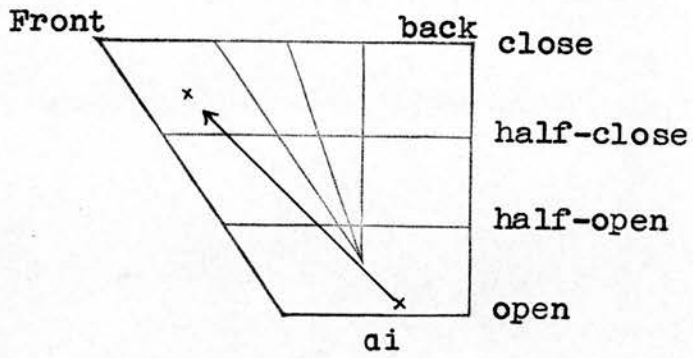
The diphthong [ai] starts at about the Tamil vowel [a] (see 4.1.61) and moves in the direction of the Tamil vowel [ɪ] (see 4.1.37).

The formation of the beginning of the diphthong [ai]:-

height of the tongue:	open
part of the tongue that is raised:	the part in advance of the centre of the back
position of lips:	medium
opening between the jaws:	medium to wide
position of the soft palate:	raised
state of the glottis:	the vocal cords vibrate, producing voice.

The formation of the end of the diphthong [ai]:-

height of the tongue:	between close and half-close
part of the tongue that is raised:	the 'front'
position of the lips:	spread
opening between the jaws:	medium
position of the soft palate:	raised
state of the glottis:	the vocal cords vibrate, producing voice.



4.5.11 Distribution:- [ai] occurs initially, medially and finally in a word. In final position [ai] occurs only in monosyllables.

Initially:	[aijəɾ]	(a brahmin)
	[aija:]	(sir !)
	[aijo:]	(alas !)
Medially:	[p'aijÃ]	(boy)
	[ʈ'ailÃ]	(medicinal oil)
	[p'aiʈ'ɪjÃ]	(mad man)
Finally:	[k'ai]	(hand)
	[p'ai]	(bag)
	[t'ai]	(name of a month)
	[ʈ'ai]	(necktie)

4.5.12 It should be mentioned that in words of more than one syllable, final orthographic ai is [ɛ] in speech. A few examples are:-

kalai	[k'alɛ]	(art)
ʈalai	[ʈ'alɛ]	(head)
ma:lai	[ma:lɛ]	(garland)

4.5.13 [aɷ]:

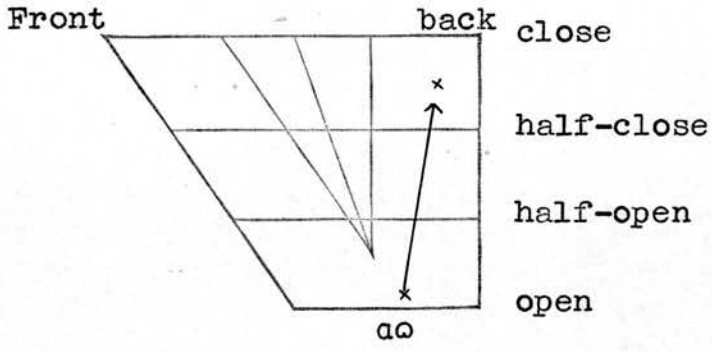
The diphthong [aɷ] starts at about the Tamil vowel [a] (see 4.1.61) and moves in the direction of the Tamil vowel [ɷ] (see 4.1.58).

The formation of the beginning of the diphthong [aɷ]:-

height of the tongue:	open
part of the tongue that is highest:	the part in advance of the centre of the 'back'
position of lips:	medium
opening between the jaws:	medium to wide
position of the soft palate:	raised
state of the glottis:	the vocal cords vibrate, producing voice.

The formation of the end of the diphthong [aɷ]:-

height of the tongue:	between half-close and close
part of the tongue that is raised:	the 'back'
position of lips:	close lip-rounding
opening between the jaws:	medium
position of the soft palate:	raised
state of the glottis:	the vocal cords vibrate, producing voice.



4.5.14 Distribution:- [ɑɷ] occurs initially and medially in a word.

Initially:	[ɑɷvɛ]	(proper name)
	[ɑɷʂəðʌ̃]	(medicine)
Medially:	[mɑɷnʌ̃]	(silence)
	[vɑɷvɑ:l]	(bat - the mammal)

Chapter V

The "Double" Stops of Tamil

(pages 227 - 268)

Chapter V

5 THE "DOUBLE STOPS" OF TAMIL.

5.1 It has been stated by many writers on the phonetics of Tamil that single and double voiceless stop consonants occur in Tamil in intervocalic position. It has also been stated that double or geminated voiceless stops occur immediately after [ʐ], [ɾ], and [j]. The examples often cited are words like kappal (ship), va:ʐkkai (life), pa:ɾttu (having seen), pojttal (falsification), etc.[1] It is true that single and double laterals and nasals occur intervocalically and in fact in almost all the dialects of Tamil there are minimal and near-minimal pairs contrasting single and double laterals and nasals. There is no second opinion about gemination being distinctive in laterals and nasals, but about the doubling or gemination of intervocalic voiceless stops there has been some difference of opinion.

5.2 Most writers on the phonetics of Tamil seem to take for granted that the voiceless stops occur geminated in intervocalic position.[2] It was Firth[3] who first used the word "long" as an alternative to

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1. Orthographic versions alone are given here. Phonetic transcriptions of the author's pronunciation are withheld for the time being.
2. See Meenakshisundaran (1965), Bright and Ramanujan (1961), Fowler (1954), to cite just a few.
3. Firth (1934, iii).

the oft-repeated expressions "doubled" and "geminated" with reference to the orthographically doubled inter-vocalic voiceless stops in Tamil. He says: "some idea of the double consonant [in Tamil] may be gathered from the double or long n-sound in the middle of the English words unknown, unnatural, or by running together the two p's of up-platform, or the two k's of black cat or the two t's of at ten. Further research is necessary, but in this short outline of the main features of Tamil it is sufficient to say that the double stop consonants pp, tt, ṭṭ, kk are NOT always double consonants in the Italian sense ... or like the two p's of up-platform run together".[4] Masica, Krishnaswamy and Chaturvedi (1963) subscribe to the unorthodox view that what is orthographically represented by two stop symbols is not phonetically a double or geminated stop. Lisker (1959) points out, with some instrumental evidence, that the contrast in Tamil stops is rather between voiceless and voiced than between single and double.

5.3 Before analysing this any further, a word or two must be said about the orthography of Tamil. As has been stated earlier,[5] the Tamil orthography has far fewer symbols than that of any other Indian language.

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4. Firth (1934, iii). Capitals are the present writer's.

5. See chapter II (2.1.2)

Each symbol representing a voiceless stop consonant also represents the corresponding voiced stop and the corresponding voiced fricative. Thus the symbol p represents [p], [b] and [β], the symbol t̲ represents [t̲], [d̲] and [ð], the symbol k represents [k], [g] and [ɣ] and the symbol ṯ represents [ṯ], [ḏ] and [ṛ].[6] Telugu, Malayalam and Kannada, the other three literary Dravidian languages,[7] have a much more elaborate orthographic system. These languages have at least four orthographic symbols where Tamil has one. To illustrate, there are separate orthographic symbols in these languages to represent [p], [p^h], [b] and [b^h]; and there are similar sets of orthographic symbols to represent the other sets of stops.

5.4 This economy in orthographic symbols may be responsible for the <u>orthographic doubling</u> of the stop symbols.[8] The phonology of the language (i.e., taking into account only native Dravidian words) is such that this economy in orthographic symbols does not present any problem. Voiceless stops (except [ṯ]) occur initially in a word, when they are represented by a single symbol in the orthography. Voiceless stops

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6. See chapter II (2.1.2)
7. For a detailed account of the Dravidian languages, see chapter I (1.1.1 to 1.1.3).
8. They are referred to as "stop symbols" because when they are in isolation, they are pronounced as voiceless stops by anyone spelling a word. When a child is taught the Tamil alphabet, he is taught to read these symbols as [pa], [t̲a], [ka] and [ṯa].

occur intervocalically. In this position voiced fricatives (voiced flap in the case of the retroflex consonant) also occur. Since both the voiceless stop and the corresponding voiced fricative have the same orthographic symbol representing them, to differentiate between the stop and the fricative, both of which occur intervocalically, the voiceless stop in this position is represented by two symbols, i.e., by writing the same symbol twice, and the voiced fricative in this position is represented by one symbol in the orthographic representation of words. Voiced stops occur (again, considering only words of Dravidian origin) immediately after the nasals and these are represented in the orthography by writing the symbol (the same symbol used to represent the voiceless stop and the voiced fricative) once. This feature is illustrated below:-

Bilabial:-

pani	[p'anɪ]	(dew)
a:pattu	[a:βaṭ'ɨ][9]	(danger)
ṭappu	[ṭ'ap:ɨ][10]	(fault)
kampi	[k'ambɪ]	(wire)

9, 10, 11. The length of the stop consonant - i.e., the duration of the closure phase - differs in different phonetic environments. If preceded by a long vowel in disyllabic words and in trisyllabic words (irrespective of the length of the preceding vowel), voiceless stops are slightly long and these are transcribed with the length-mark [ˈ]. If preceded by a short vowel in disyllabic words, voiceless stops are very long and these are transcribed with the length-mark [:]. More about this is said later in this chapter.

Dental:-

t̪iɾi	[t̪'ɪɾɪ]	(wick)
at̪u	[aðɨ]	(it)
at̪t̪ai	[at̪:ɛ]	(aunt)
pant̪u	[p'and̪ɨ]	(ball)

Retroflex:-

a:ʈu	[a:ɽɨ]	(goat)
aʈʈai	[aʈ:ɛ]	(cardboard)
naɳʈu	[naɳɖɨ]	(crab)

Velar:-

kaɾi	[kaɾɪ]	(charcoal)
pa:ku	[p'a:ɲɨ]	(caramel)
pa:kku	[p'a:k•ɨ][11]	(areca nut)
paŋku	[p'aŋgɨ]	(share)

5.5 A few kymograms are reproduced on the next few pages to illustrate that initial P and intervocalic -PP- are voiceless stops, intervocalic -P- is a voiced fricative (or flap) and -NP- is a voiced stop.[12]

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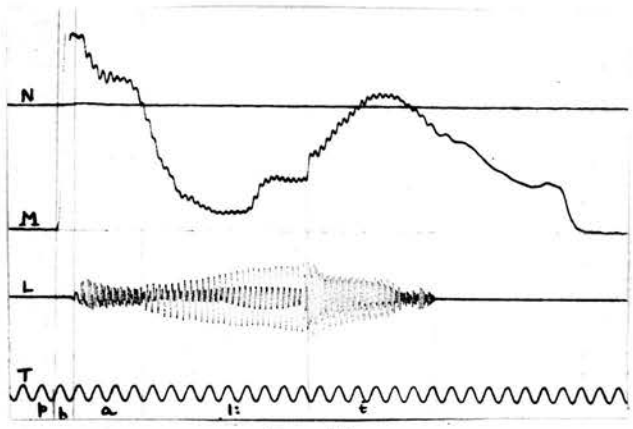
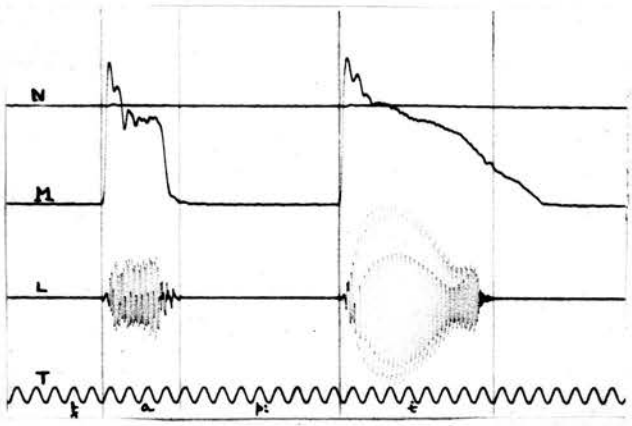
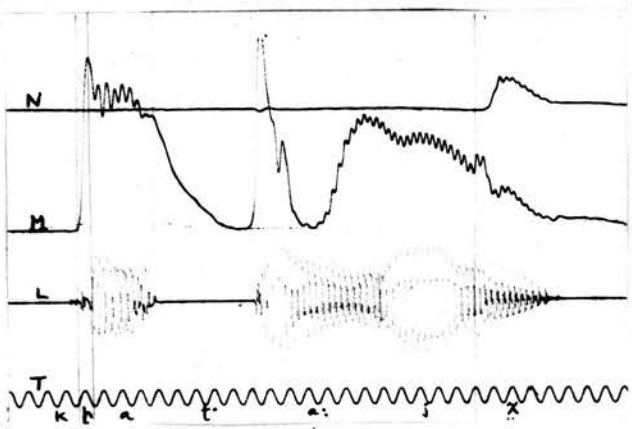
12. P stands for a stop consonant and N for a nasal consonant.



Kgm. 53
pal [pál:ǎ] (tooth)



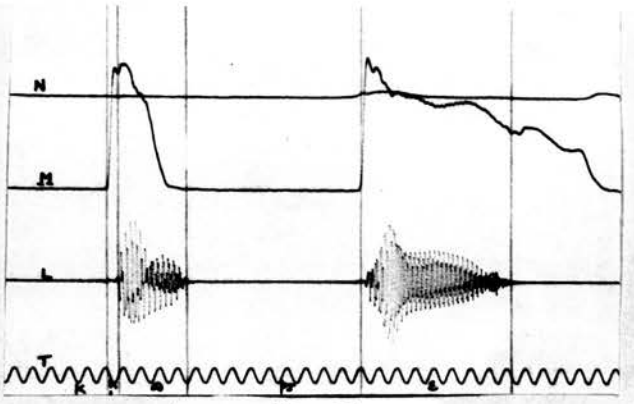
Kgm. 54
ţappu [ţáp:ǔ] (fault)



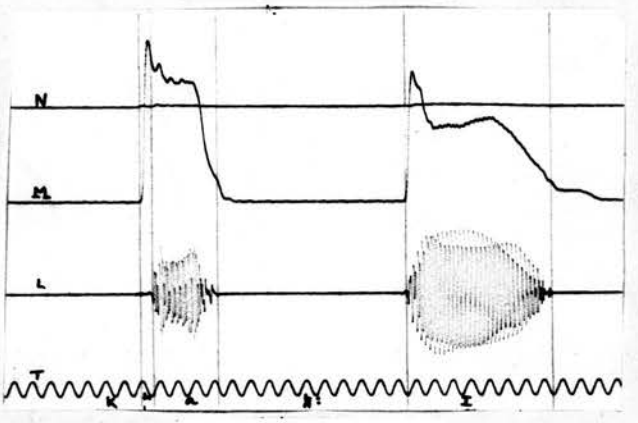
Kgm. 55
kaţţa:jam [kʻʌţ:jɣ] (certainly)

Initial orthographic -p-, -t-, and -k- are voiceless stops in speech

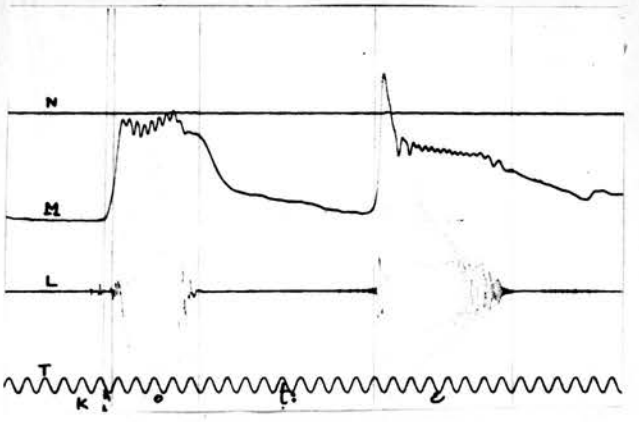
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 56
kuppai [kʌ́pːɛ] (rubbish)



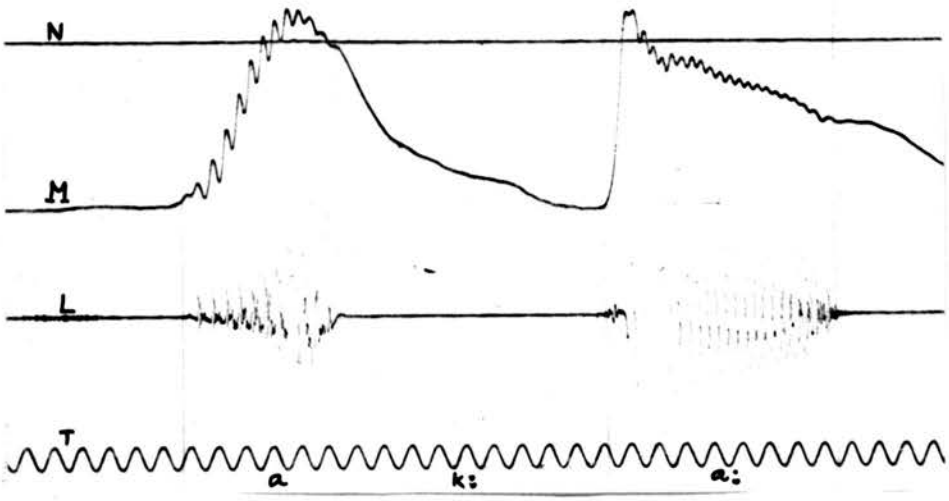
Kgm. 57
katti [kʌ́ʈːɪ] (knife)



Kgm. 58
kottai [kʰoʈːɛ] (seed)

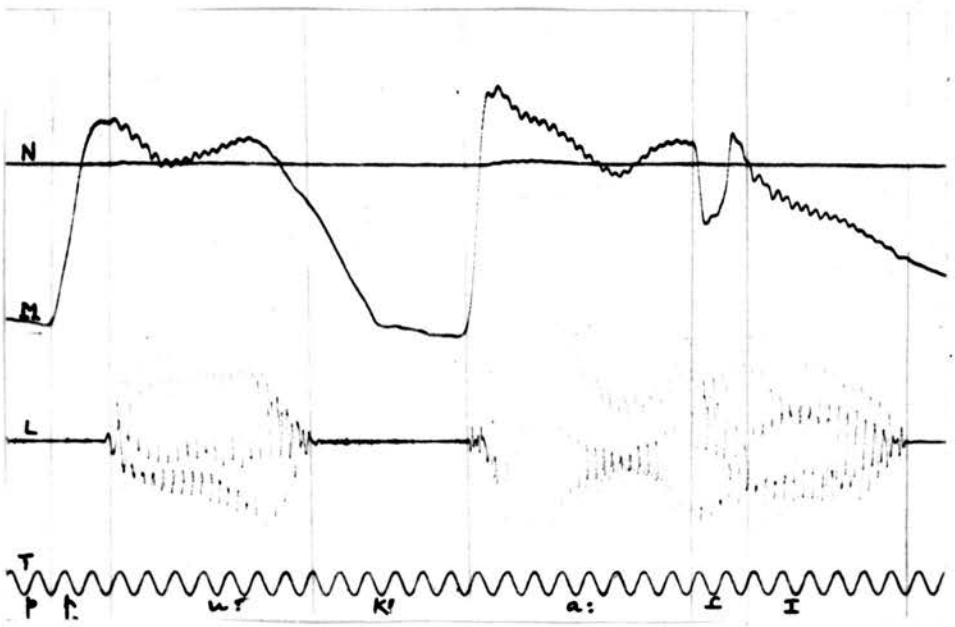
Intervocalic orthographic -pp-, -tt-
-tt- are voiceless stops in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 59

akka: [ak:a:] (elder sister)

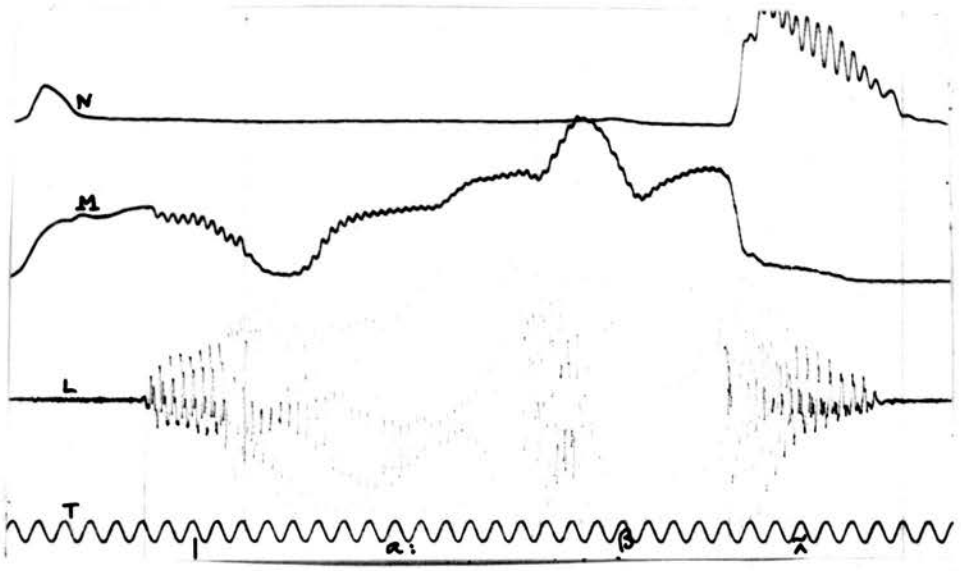


Kgm. 60

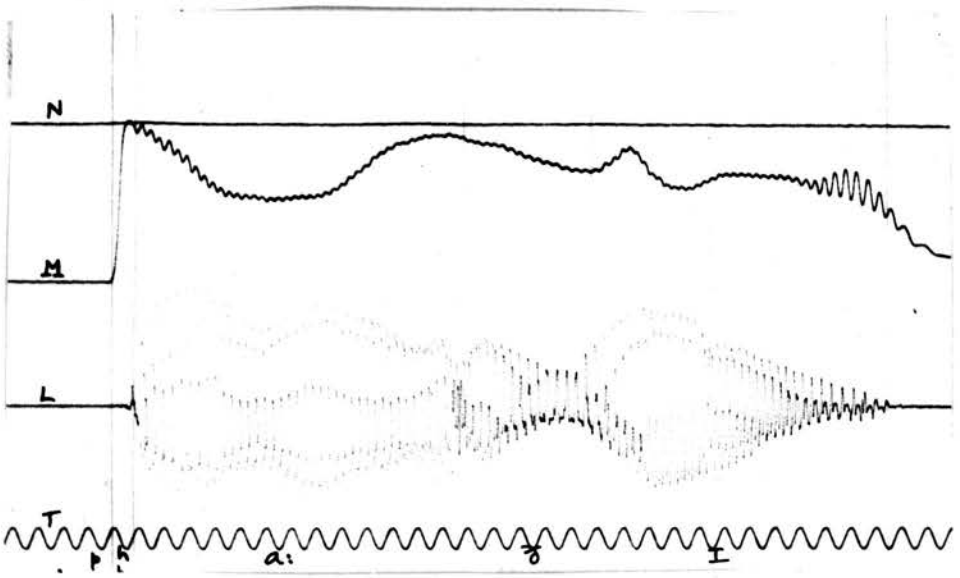
pu:kka:ɟi [pʊ̟ːkˑaːɾɪ]
(flower-girl)

Intervocalic orthographic -kk- is a voiceless stop in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



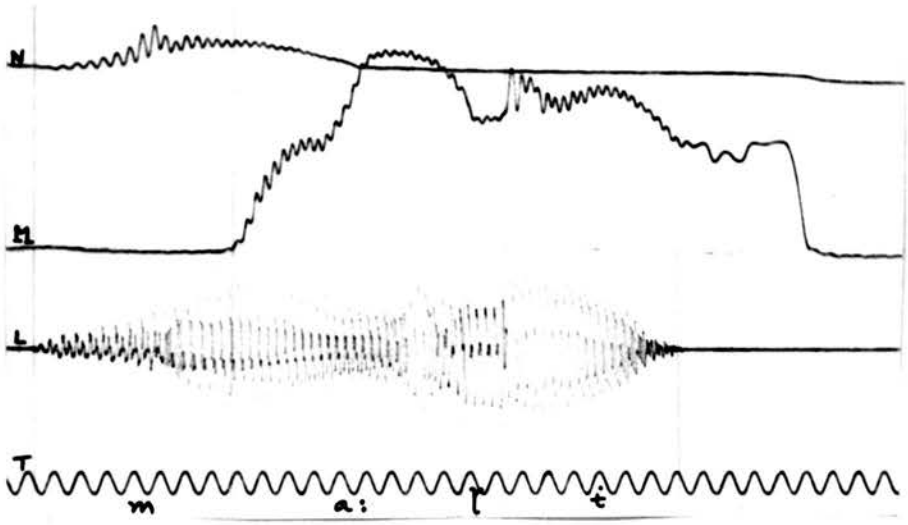
Kgm. 61
la:pam [la:βɤ̃] (profit)



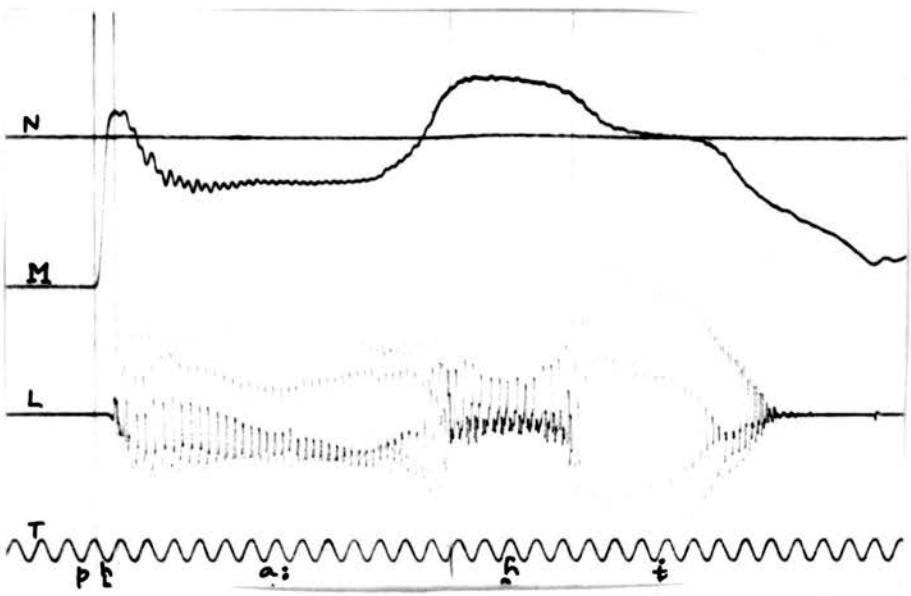
Kgm. 62
pa:ti [p'a:ðɪ] (half)

Intervocalic orthographic -p- and -t- are voiced fricatives in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



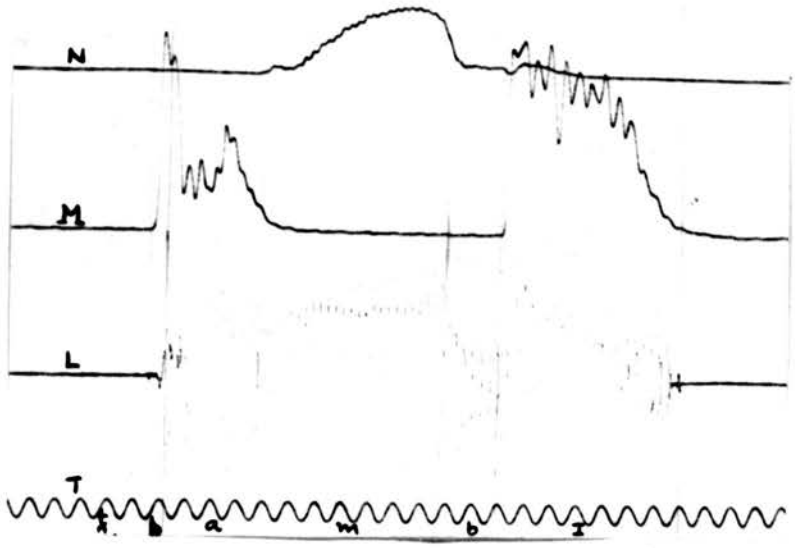
Kgm. 63
ma:ṭu [ma:ɾ̥] (cow)



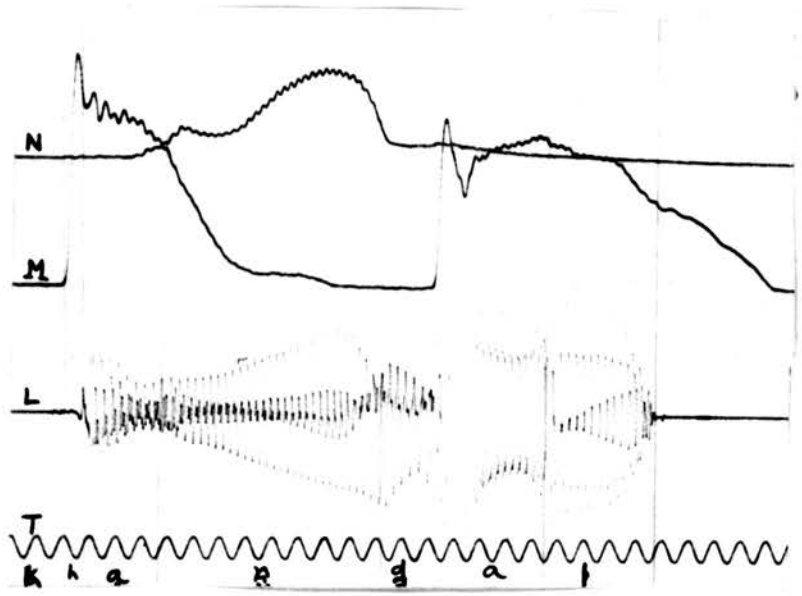
Kgm. 64
pa:ku [pʻa:ɦɨ] (caramel)

Intervocalic orthographic -ṭ- is a voiced flap and intervocalic orthographic -k- is a voiced fricative in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



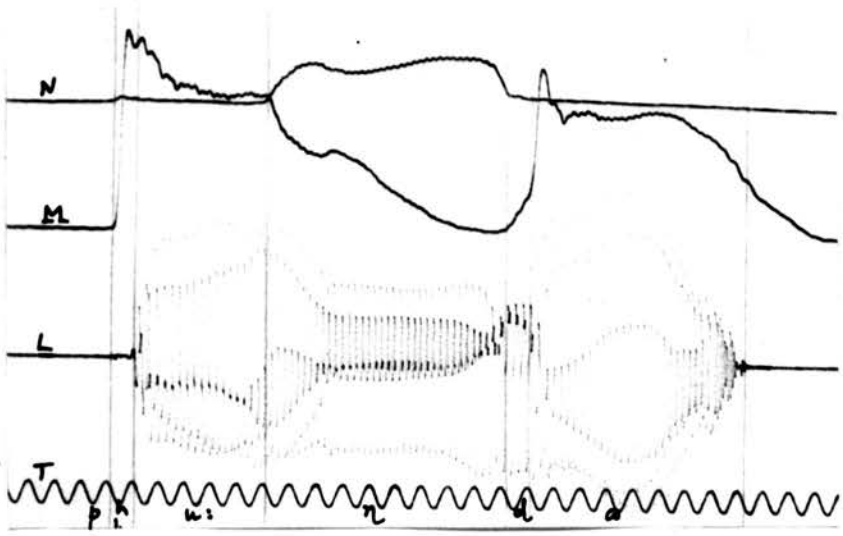
Kgm. 65
ṯambi [ṯ'ambɪ] (younger brother)



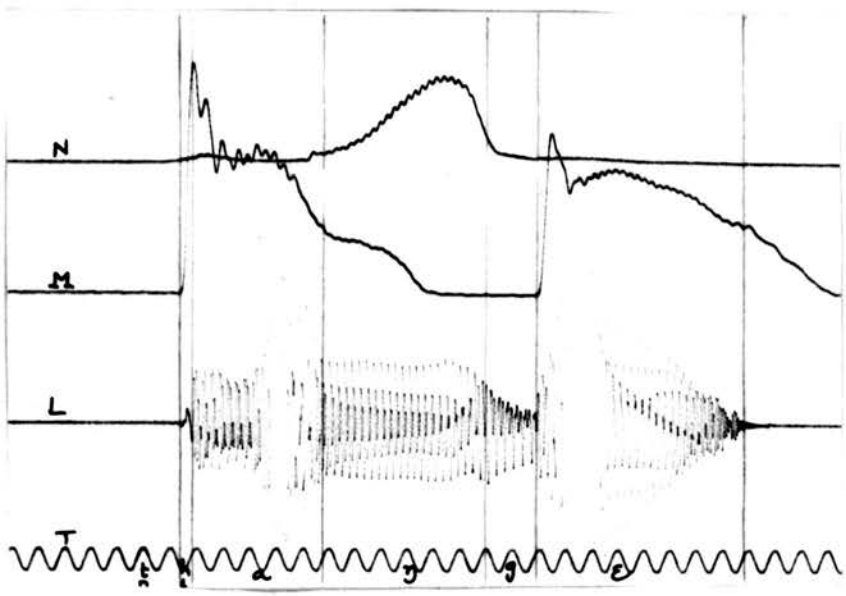
Kgm. 66
kaṇṯal [kaṇḍal] (rags)

Orthographic **ṉ** and **ṯ** preceded by a nasal are voiced stops in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 67
pu:ŋtu [pù:ŋɖɑ] (garlic)



Kgm. 68
tʰaŋkai [tʰɑŋgɛ] (younger sister)

Orthographic t and k preceded by a nasal are voiced stops in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

5.6 From these kymograms we see that though the orthography has a single voiceless stop symbol and a double voiceless stop symbol [13] intervocalically, only what is represented by a double symbol is a voiceless stop phonetically. What is represented by a single stop symbol in intervocalic position is invariably voiced in speech and further, it is not a stop. In all the kymograms (kgms. 61, 62, 63 and 64) reproduced in the preceding pages, the mouth-tracing corresponding to what is orthographically represented by -P- [14] does not show a sharp upward peak that is characteristic of the release of a stop consonant, nor is there a mouth closure during the articulation of these sounds, nor does the larynx tracing corresponding to these sounds show a straight line - the larynx tracing shows a spiky line, indicating the vibration of the vocal cords.

5.7 In Tamil we have no examples of pairs like fata (fairy) - fatta (done), papa (Pope) - pappa (bread soup) as in Italian; kapi (monkey) - kappe (frog), a:ke (she) - akka: (elder sister) as in Kannada; me:ka (goat) - mekki (gluttonous), paṭamu (picture) - paṭṭu (silk) as in Telugu. In these minimal and near-minimal pairs

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13. We realize that there are difficulties in talking about a "voiceless stop symbol" when the phonetic realization of it (when it occurs singly in intervocalic position)is neither voiceless nor a stop. A justification in using this slightly awkward term is that whenever these orthographic symbols are pronounced in isolation, they are always pronounced as voiceless stops. See footnote 5 of chapter II (page 46) and footnote 8 of this chapter (page 230)

14. An intervocalic single stop symbol.

there is a contrast between long and short closure (or single and double consonants) in connection with voiceless stops. No such pairs can be found in Tamil enabling us to make a similar comparison of the duration of the stop element in what is orthographically represented by single and double symbols. There are minimal pairs like potu (common) and pottu (cover - imp.) paṭi (measure) and paṭṭi (cow-shed) and pa:ku (caramel) and pa:kku (areca nut), contrasting single and double stop symbols. But at the phonetic level, these words are [p'oðo], [p'ot̪:o], [p'aɽɪ], [p'aʈ:ɪ], [p'a:ɲɨ] and [p'a:k'ɨ] respectively. In other words, intervocalic orthographic single stops are not voiceless stops at all.

5.8 If we observe kymograms 56, 57, 58, 59 and 60 reproduced above, we notice that the duration of closure for the intervocalic voiceless stops varies considerably. Regarding this, Firth (1934, iii-iv) observes: "They [the long voiceless stops represented in the orthography by -pp-, -t̪t̪-, -ʈʈ- and -kk-] are always voiceless ... they vary considerably in length. The long stops or occlusions of pp, t̪t̪, ʈʈ, kk are longest and therefore most like "double" consonants when preceded by a short vowel in a prominent syllable ... After long vowels the stop or occlusion of pp, t̪t̪, ʈʈ, kk are shorter than in the preceding case". The present writer, depending upon his proprioception, felt that the duration of the stop element of the orthographic double stops is short in disyllables when they are

preceded by a long vowel and also in trisyllabic and polysyllabic words, irrespective of the length of the vowel preceding the stops. He also felt that the duration of the stop element is longer in disyllabic words when the stops are preceded by short vowels.

5.9 An elaborate study was undertaken during the course of the present research to find out how much and in what phonetic environments the duration of closure of voiceless stop varies. The words chosen for analysis include:-

(a) Disyllabic words with the stops preceded by short and long vowels,

(b) Trisyllabic and/or polysyllabic words with the stops preceded by long and short vowels,

(c) Words in which there are orthographic double stops but which are one of two abutting consonants in speech.

Kymograms were made of these words. To check consistency in pronunciation or lack of it, each one of these words was said into the electric aerometer three or six times. A few examples of word-initial voiceless stops in connected speech like [ɪðɨ t̪ʻɑp:ɨ] (this is a mistake) were also chosen. The duration of closure of the voiceless stops was measured from these kymograms. The findings were tabulated. There is a Table each for [p], [t̪], [ʈ] and [k]. These Tables are reproduced in Appendix IIIa. A Summary chart of these Tables is reproduced below:-

Duration of the stop element in stop consonants

Table 15:- Kymographic analysis of words said in isolation — Summary Chart

stop consonant	Intervocalic orthographic double consonant, preceded by a short vowel in Disyllabic words	Intervocalic orthographic double consonant, preceded by a long vowel in disyllabic words	Intervocalic orthographic double consonant, preceded by a long or short vowel in trisyllabic or polysyllabic words	Orthographic double consonant which is one of two abutting consonants in speech	Word-initial orthographic single consonant in connected speech	Orthographic medial single consonant - (Not all the words tested in this category occur in colloquial speech)
[p]	duration of the stop varies between 150 and 200 m.secs. in 30 samples. average: 173 m.secs.	duration of the stop varies between 100 and 130 m.secs. in 21 samples. average: 115 m.secs.	duration of the stop varies between 90 and 130 m.secs. in 33 samples. average: 114 m.secs.	duration of the stop varies between 80 and 160 m.secs. in 27 samples. average: 124 m.secs.	duration of the stop varies between 60 and 120 m.secs. in 12 samples. No average was taken because duration of the word-initial stop depends upon the pause between the word beginning with a voiceless stop and the preceding word.	duration of the stop varies between 110 and 220 m.secs. in 12 samples. average: 175 m.secs.
[t̪]	duration of the stop varies between 165 and 220 m.secs. in 33 samples. average: 191 m.secs.	duration of the stop varies between 100 and 120 m.secs. in 36 samples. average: 109 m.secs.	duration of the stop varies between 100 and 135 m.secs. in 27 samples. average: 112 m.secs.	duration of the stop varies between 80 and 130 m.secs. in 24 samples. average: 111 m.secs.	duration of the stop varies between 60 and 120 m.secs. in 12 samples. No average was taken	No samples available in this category.
[t]	duration of the stop varies between 160 and 210 m.secs. in 39 samples. average: 177 m.secs.	duration of the stop varies between 100 and 130 m.secs. in 39 samples. average: 114 m.secs.	duration of the stop varies between 105 and 125 m.secs. in 21 samples. average: 114 m.secs.	duration of the stop varies between 80 and 135 m.secs. in 30 samples. average: 108 m.secs.	duration of the stop varies between 70 and 120 m.secs. in 12 samples. No average was taken.	No samples available in this category.
[k]	duration of the stop varies between 190 and 210 m.secs. in 30 samples. average: 194 m.secs.	duration of the stop varies between 110 and 130 m.secs. in 30 samples. average: 119 m.secs.	duration of the stop varies between 90 and 140 m.secs. in 57 samples. average: 116 m.secs	duration of the stop varies between 90 and 145 m.secs. in 27 samples. average: 116 m.secs.	duration of the stop varies between 60 and 110 m.secs. in 12 samples. No average taken.	duration of the stop varies between 100 and 200 m.secs. in 15 samples. average:162 m.secs.

5.10 A few of the kymograms from which the duration of the stop element of stop consonants was calculated are reproduced on the next few pages. This detailed kymographic analysis shows that:-

(a) The orthographic double stop is longest when it is preceded by a short vowel in a disyllabic word.

(b) It is of considerably shorter duration when it is preceded by a long vowel in a disyllabic word. (Compare kymograms 69 and 70; 75 and 76; 80 and 81; and 85 and 87.)

(c) It is considerably shorter again, when it occurs in a trisyllabic or polysyllabic word, whether it is preceded by a long or short vowel. (Compare kymograms 69, 71 and 72; 75, 77 and 78; 80 and 82; and 85 and 86.)

(d) In the colloquial pronunciation of certain words, what is orthographically -PPVC_1VC_2- or -PPVCC- [15] is -PC- in speech. For example, orthographic kottukiɾe:n (I'm throwing) is [k'otɾɛ̃] in speech and orthographic maːppillai (bridegroom) is [maːplɛ] in speech. In such cases, the duration of the stop element of the stop consonant is short. (see

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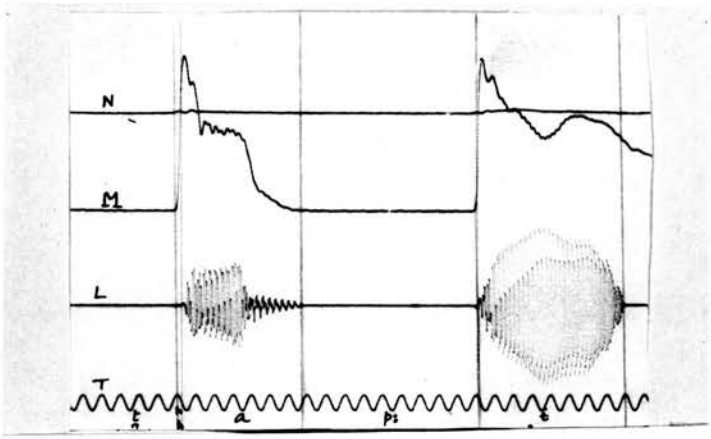
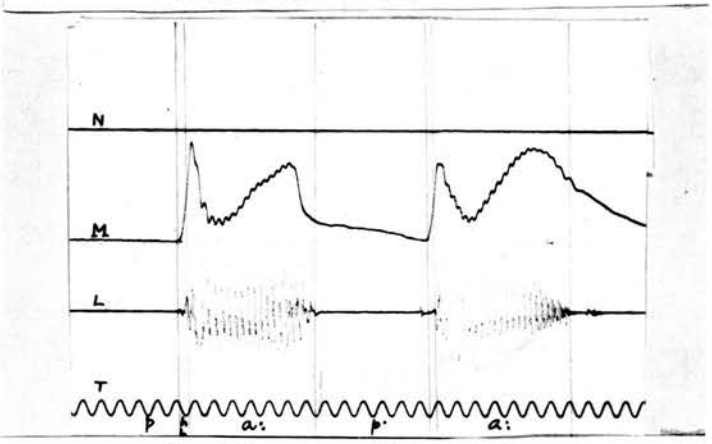
15. P- a voiceless stop symbol.
V- vowel symbol.
C_1,C_2 - any non-stop consonant symbol.



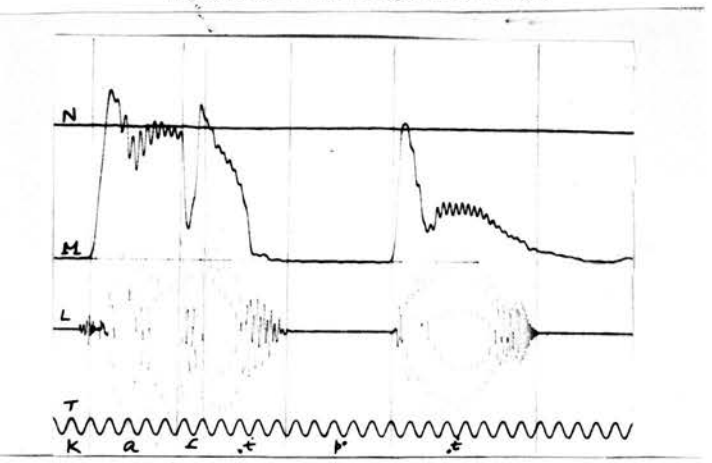
Kgm. 69 tappu [t̪ʌp:ɨ] (fault)

Orthographic -pp- preceded by a short vowel in a disyllabic word.



Kgm. 70 pa:ppa: [p'a:p·a:] (child)

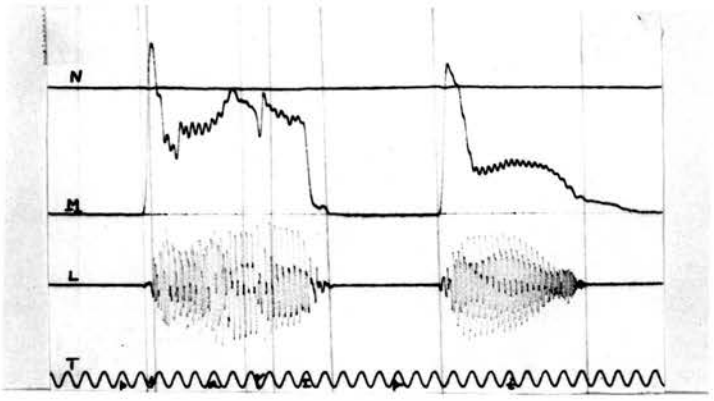
Orthographic -pp- preceded by a long vowel in a disyllabic word.



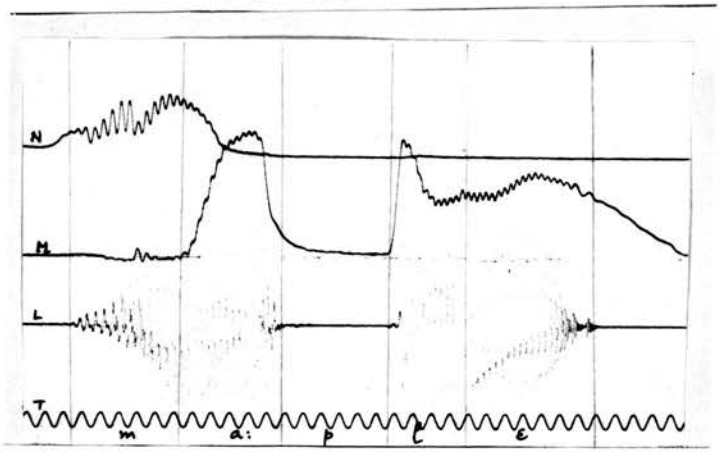
Kgm. 71 karuppu [k'ʌɾʌp·ɨ] (black)

Orthographic -pp- in a trisyllabic word.

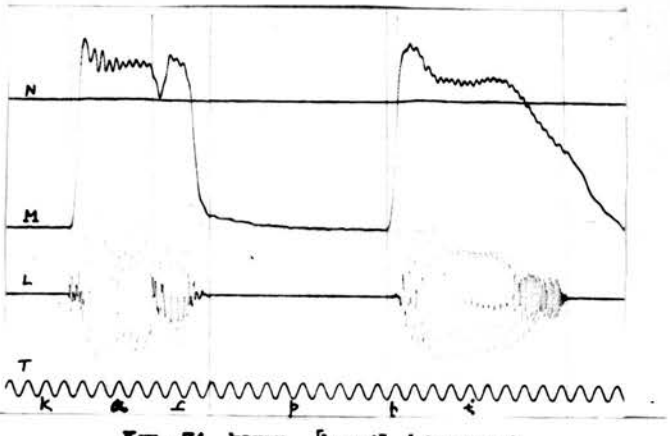
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 72 paṭippu [p'aɾɪp'ú] (education)
Orthographic -pp- in a trisyllabic word.

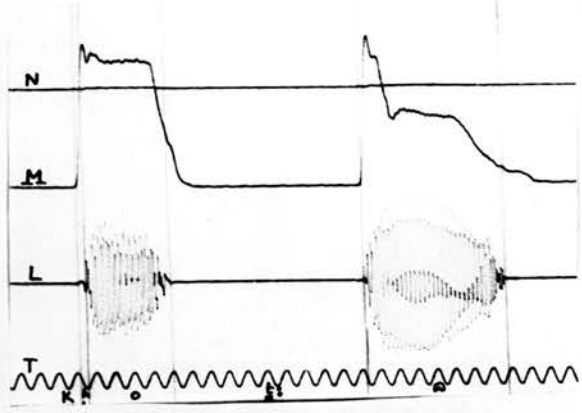


Kgm. 73 ma:ppiḷḷai [maːpɭɛ] (bridegroom)
Orthographic -ppiḷḷ- —in speech.



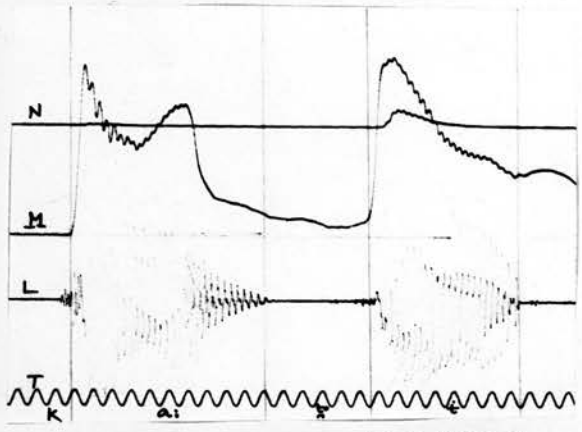
Kgm. 74 karpu [kaɾpú] (chastity)
Orthographic medial single -k-

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



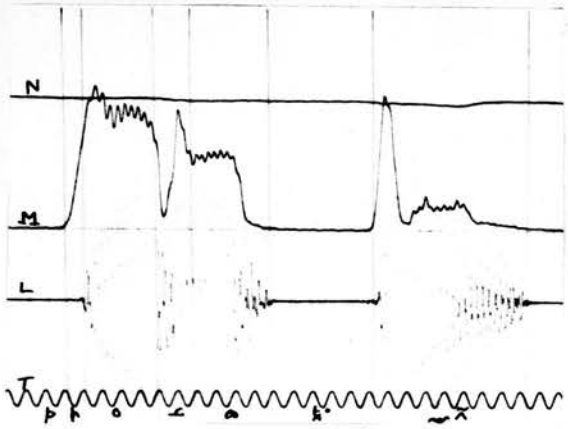
Kgm. 75 kot̪̪u [kóṭ̪:ə] (dig -imp.)

Orthographic -t̪̪- preceded by a short vowel in a disyllabic word.



Kgm. 76 kaːṯ̪u [kaːṭ̪·i] (wind)

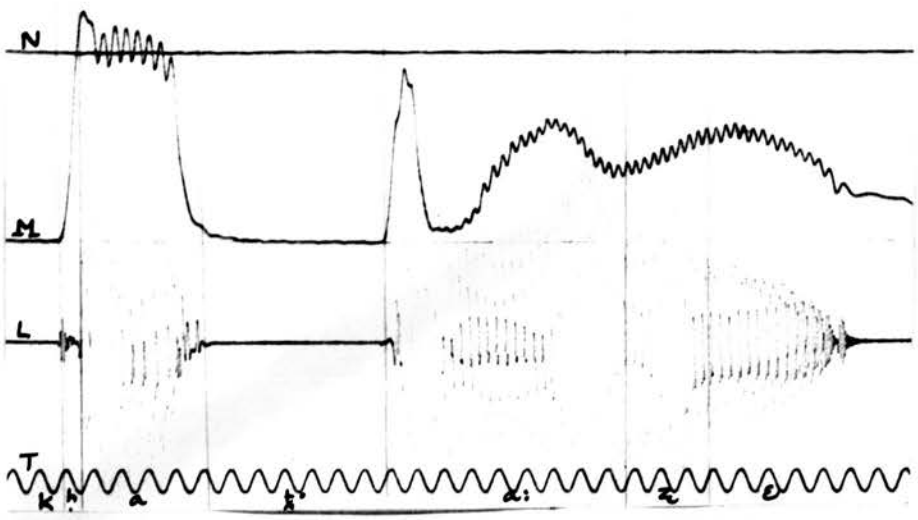
Orthographic -tt- preceded by a long vowel in a disyllabic word.



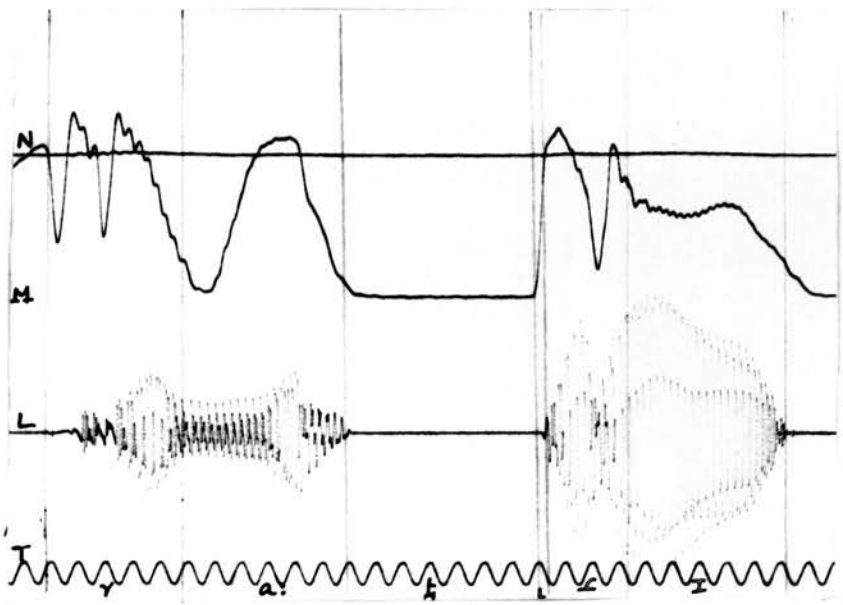
Kgm. 77 poruṯ̪am [pɔ.ʌṭ̪.ˣ] (suitability)

Orthographic -t̪̪- in a trisyllabic word.

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

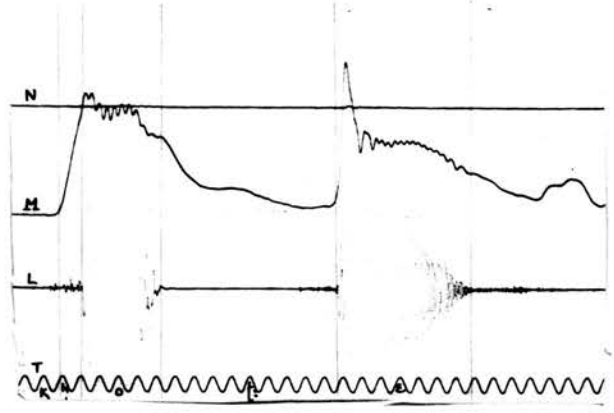


Kgm. 78 ka$\underline{\overset{\text{t}}{\text{t}}}$a:ɣai [kʻaʈ·a:ɣɛ](cactus)
Orthographic -$\underline{\overset{\text{t}}{\text{t}}}$- in a trisyllabic word.



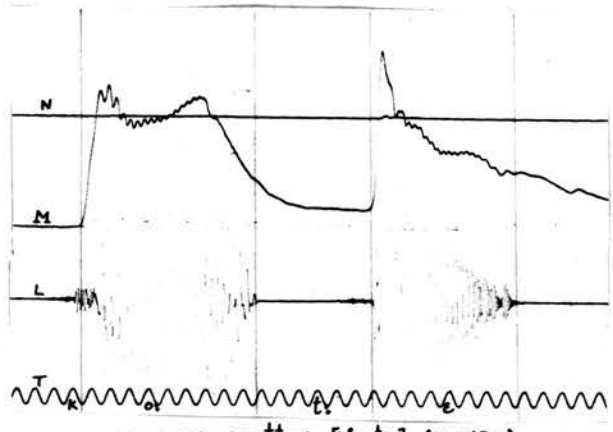
Kgm. 79 ʃa:$\underline{\overset{\text{t}}{\text{t}}}$iʃi [ʃa:ʈʃɪ](night)
Orthographic -$\underline{\overset{\text{t}}{\text{t}}}$iʃ- ---[ʈʃ]in speech.

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



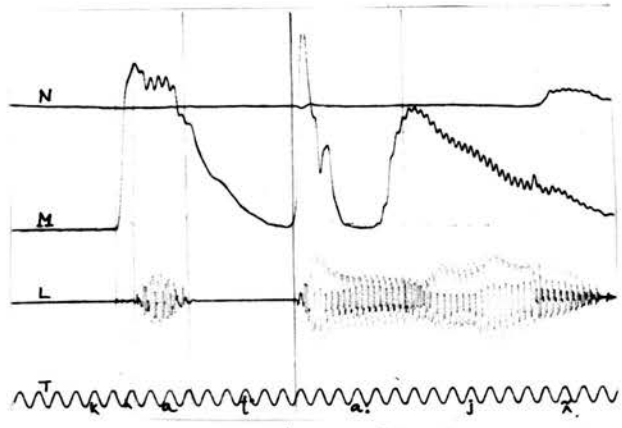
Kgm. 80 kottai [kóṭ:ɛ] (seed)

Orthographic -tt- preceded by a short vowel in a disyllabic word.



Kgm. 81 ko:ttai [kó:ṭ·ɛ] (castle)

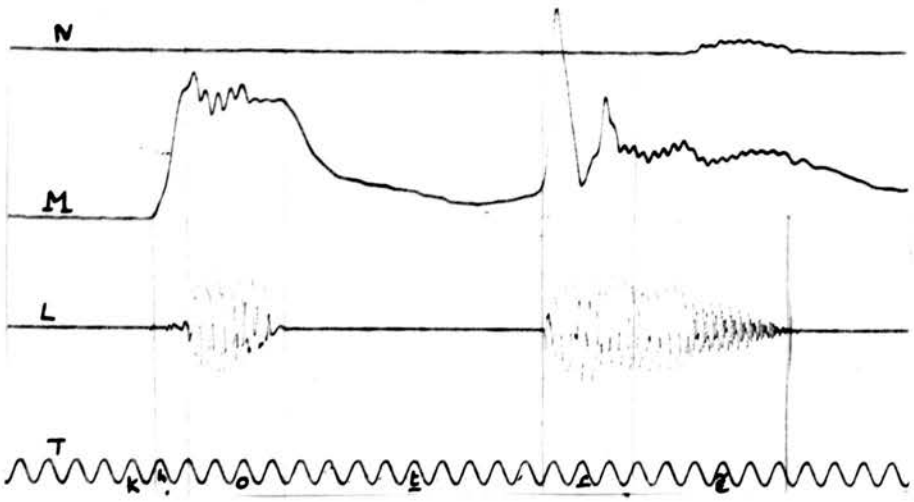
Orthographic -tt- preceded by a long vowel in a disyllabic word.



Kgm. 82 kaṭṭa:jam [kəṭəd͡ʒ̆] (certainly)

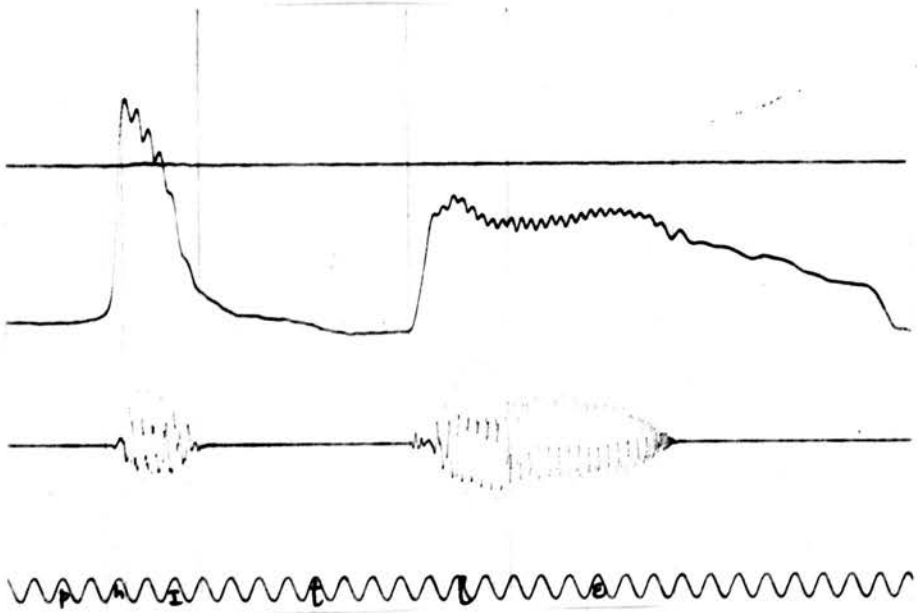
Orthographic -tt- in a trisyllabic word.

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 83 kottukire:n [kˈoʈːɾɛ̃] (I'm throwing)

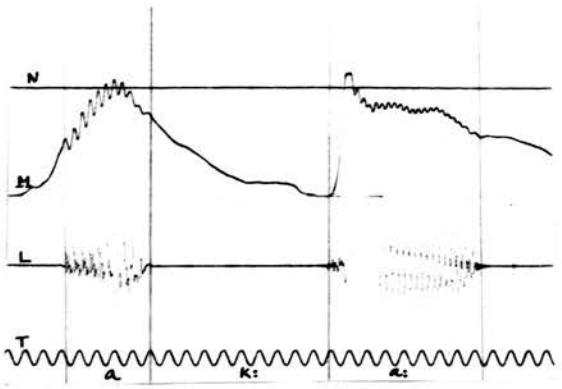
Orthographic - ttukir- --[ʈɾ] in speech



Kgm. 84 pittalai [pˈɪʈʈʌlɛ] (a kind of curry)

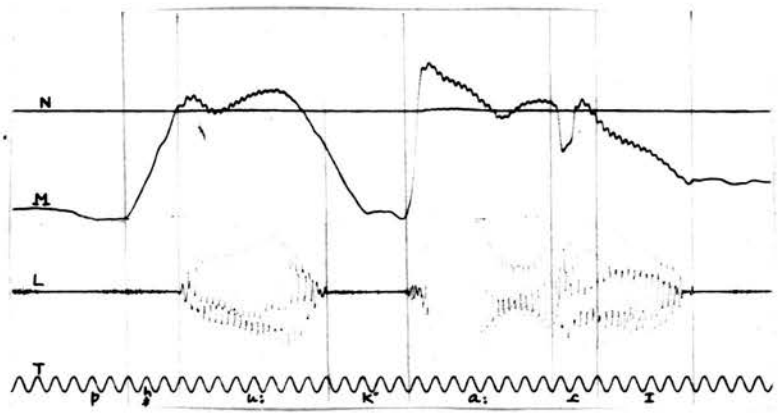
Orthographic - ttal- --[ʈʈ] in speech

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



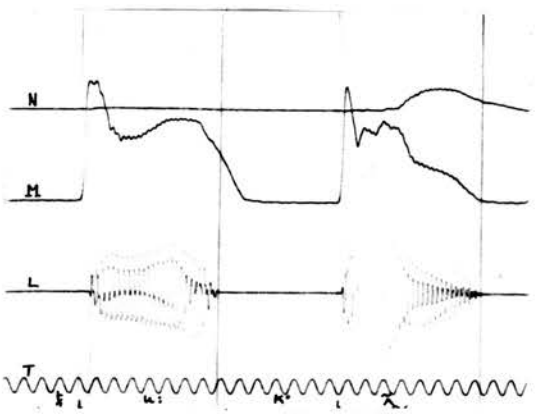
Kgm. 85 akka: [ak:a:] (elder sister)

Orthographic -kk- preceded by a short vowel in a disyllabic word.



Kgm. 86 pu:kkaɾi [pu:k·aɾɪ] (flower girl)

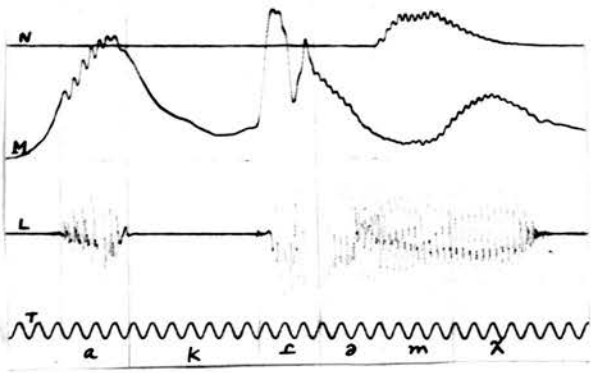
Orthographic -kk- in a trisyllabic word



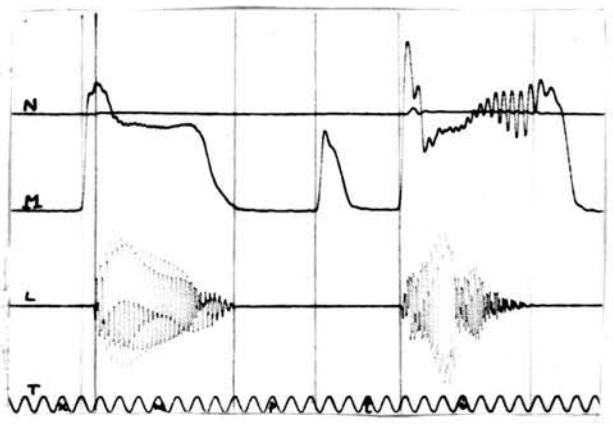
Kgm. 87 tu:kkam [tu:k·ɲ] (sleep)

Orthographic -kk- preceded by a long vowel in a disyllabic word.

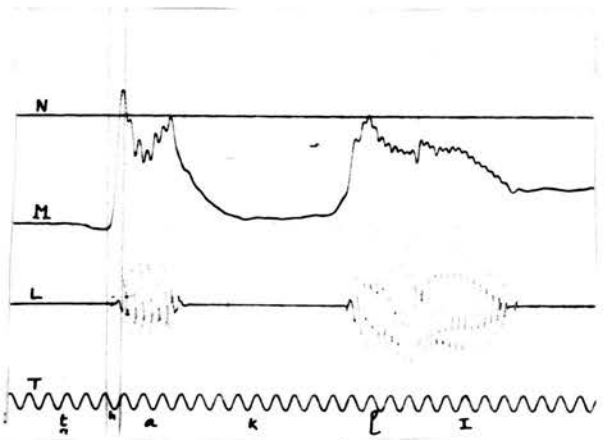
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)



Kgm. 88. akkiɾamam [ᵃkɾəmɤ̃] (unjust)
Orthographic -kkiɾ- — [kɾ] in speech



Kgm. 89 ku:ppi̪t̪tu [ku:pt̪ɨ] (having called)
Orthographic -ppi̪t̪t- — [pt̪] in speech .



Kgm. 90 t̪akɾi [t̪ʰakɾɪ] (spindle)
Orthographic single -k-

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

kymograms 73, 79, 83, 88 and 89).

(e) In certain words in which the orthography represents the stop by one symbol (after the symbol r which represents [r] ~ [ɾ]) the duration of the stop is longer than it is in some words in which the orthography represents the stop by two symbols. (see kymogram 74)

5.11 Of the 579 samples used in this analysis, more than 500 have orthographic double stop symbols, but the duration of the stop element varies between 80 m.secs. and 220 m.secs. It is thus clear that the longer duration of the stop element and the orthographic doubling of the stop symbol have no one-to-one relationship with each other.

5.12 In order to measure the duration of closure of orthographic single voiceless stops, sets of expressions were chosen with word-initial voiceless stops and the demonstrative pronouns "this or "that" inserted before these expressions. This had to be done because what is represented by a single voiceless stop symbol in the orthography in word-medial position is not a voiceless stop in speech. (e.g., [ɪðɨ t̪ak•a:l̪ɪ] (this is a tomato) and [aðɨ p'a:t̪ɾÃ] (that is a vessel)). The duration of closure of the word-initial stop consonant was found to depend upon the pause given between the demonstrative and the word with an initial voiceless stop. Two expressions were chosen for each voiceless stop and each one was said six times. The duration

was found to vary considerably. The results got (tabulated in Table 15) were thus considered unsuitable for statistical purposes and hence no average was taken of these.

5.13 Since there is no connection between the orthographic doubling of the stop symbol and the duration of the stop element of the stops and since orthographic intervocalic single stop symbol is never a voiceless stop in speech, one has to come to the conclusion that the orthographic doubling of the stop consonant symbols merely indicates that they have to be pronounced as voiceless stops. This seems to be one way of getting over the difficulty of the same orthographic symbol representing the voiceless stop and the corresponding voiced fricative/flap. And one gets confirmation of this by considering compound words and connected speech.

5.14 In many compound words, if the first of the two words forming the compound ends in a vowel and the second begins with a voiceless stop, the word-initial voiceless stop of the second word is <u>orthographically</u> doubled. A few examples are cited below in orthography.

kaṭṭi + kuttu	=	kaṭṭikkuttu	(a stab with a dagger)
pa:ppa: + pa:ṭṭu	=	pa:ppa:ppa:ṭṭu	(children's song)
velli + taṭṭu	=	vellittaṭṭu	(silver plate)
pani + kaṭṭi	=	panikkaṭṭi	(a slab of ice)

5.15 This kind of orthographic doubling is true of connected speech also. This can be illustrated with the following sentence. Let us take a sentence like "read this, let me know about it and go". In Tamil, the words forming this sentence are:

itai	paṭittu	pa:ṛttu	tʃolli	viṭṭu	po:
(this)	(read)	(see)	(tell(me))		(go)

The sentence will appear in orthography as:

itaip paṭittup pa:ṛttutʃ tʃolli viṭṭup po:

5.16 In the above example, the word-initial orthographic symbols representing voiceless stops and the voiceless palato-alveolar affricate are doubled orthographically if the previous word ends in a vowel. But the intriguing thing about this is the fact that not all the word-initial stops and affricates are doubled orthographically in writing a bit of connected prose. A few examples of orthographic doubling and a few other examples in which there is no such orthographic doubling are given below:

(a) Orthographic doubling:-

ṛa:manai + ke:ṭṭe:n = ṛa:manaikke:ṭṭe:n
(I asked Rama)

ṛa:manukku + koṭutte:n = ṛamanukkukkoṭutte:n
(I gave Rama)

karuppu + pe:na: = karuppuppe:na
(black pen)

(b) no orthographic doubling:-

aɻaka:na + peɳ = aɻaka:na peɳ (beautiful girl)

nalla + paijan = nalla paijan (good boy)

peɾija + peṭṭi = peɾija peṭṭi (big box)

5.17 In the midst of what appears to be irregular about this feature of orthographic doubling in compound words and in connected prose, one thing strikes anyone attempting a phonetic study of Tamil. And that is, when the orthography doubles the symbol representing the stop consonant in a compound word or in a piece of connected prose, a Tamil speaker always pronounces the orthographically doubled symbol as a voiceless stop, however rapidly he speaks or reads.

5.18 On the other hand, in connected speech, the word-initial stop symbol which is NOT doubled orthographically may not be a voiceless stop in speech. To illustrate, pu:nai (cat) in isolation is [p'u:nɛ]. pattu pu:nai (ten cats) is written paṭṭuppu:nai, with the p of the second word doubled orthographically and this expression is always pronounced with a voiceless stop in the middle of the expression. But, "a cat" is written oɾu (a,one) pu:nai (cat) without the p of the second word doubled. These two words are [woɾoβu:nɛ] or [woɾo p'u:nɛ] in speech, depending upon whether or not there is a pause between "a" and "cat".

5.19 A few sentences in connected speech were examined with the help of kymographic tracings. The duration of the stop element of the voiceless stops was measured in these cases, too. Weeks after the kymograms were made, the same sentences were tape-recorded and wide-band spectrograms made. The duration of the stop element of the voiceless stops was measured from the spectrograms. Detailed measurements are given in Appendix IIIb. Tabulated summary and results are given on the following page. Following the summary chart are reproduced a few of the kymograms and spectrograms from which the duration of closure of the voiceless stops was measured.

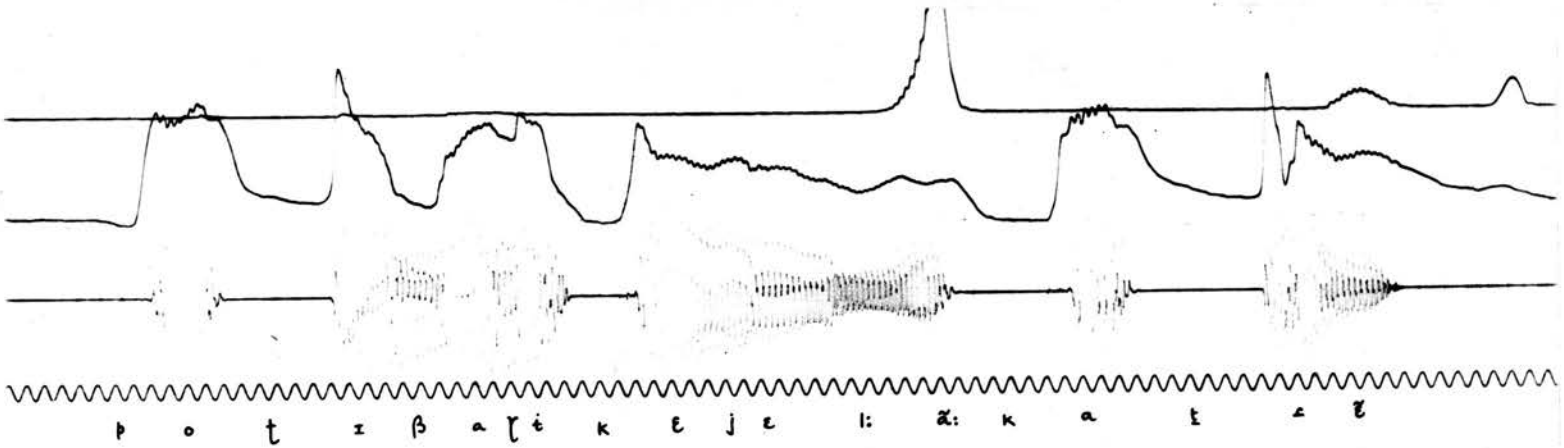
Duration of the stop element in stop consonants.

Kymographic and spectrographic analysis of connected speech - Summary chart - details in Appendix IIIb.

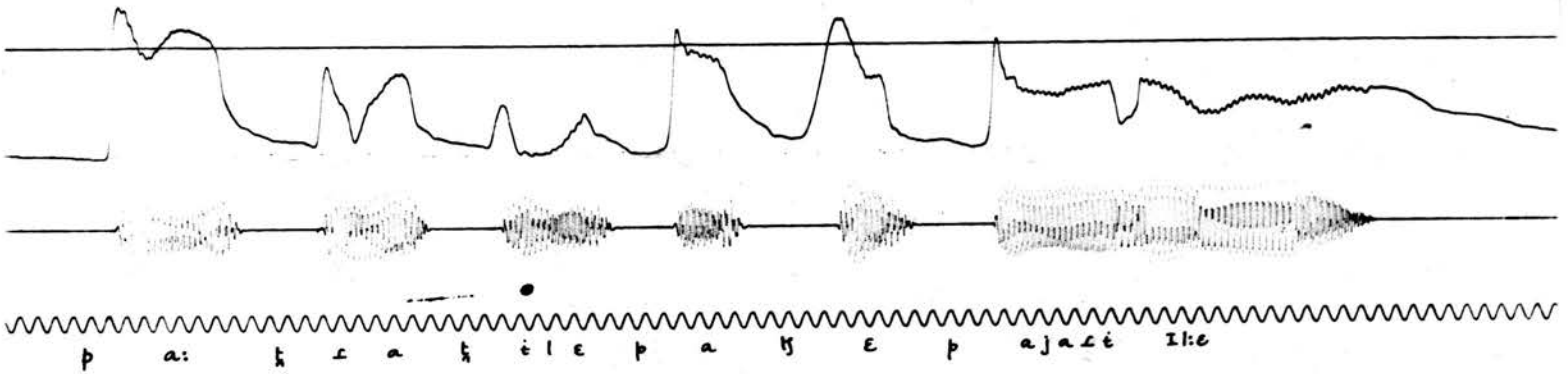
Table 16:-

stop consonant	Intervocalic orthographic double consonant, preceded by a short vowel in di-syllabic words.	Intervocalic orthographic double consonant preceded by a long vowel in di-syllabic words.	Intervocalic orthographic double consonant preceded by a short or long vowel in tri-syllabic or poly-syllabic words.	Orthographic double consonant which is one of two abutting consonants in speech.	Medial orthographic single consonant.	Word-initial orthographic single consonant, NOT DOUBLED in writing down connected speech.	Word-initial orthographic single consonant, DOUBLED in writing down connected speech.
[p]	duration of stop varies between 136 and 200 m.secs. in 6 samples. average: 155 m.secs	duration of stop varies between 58 and 70 m.secs. in 6 samples. average: 65 m.secs.	duration of stop varies between 70 and 115 m.secs. in 12 samples. average: 99 m.secs	duration of stop varies between 80 and 100 m. secs. in 6 samples average:95 m.secs.	duration of stop varies between 60 and 76 m.secs. in 3 samples. average:67 m.secs.	duration of stop varies between 45 and 120 m.secs. in 30 samples. average:79 m.secs.	duration of stop varies between 30 and 140 m.secs. in 18 samples. average:96 m.secs.
[t]	duration of stop varies between 110 and 150 m. secs in 12 samples average:133 m.secs	duration of stop varies between 66 and 204 m.secs. in 12 samples. average:109 m.secs	duration of stop varies between 60 and 86 m.secs. in 12 samples. average:72 m.secs.	duration of stop varies between 50 and 165 m.secs. in 9 samples. average:95 m.secs.	No samples	No samples	duration of stop varies between 40 and 105 m.secs. in 18 samples. average:82 m.secs.
[t]	duration of stop varies between 50 and 115 m.secs. in 18 samples. average:87 m.secs.	duration of stop varies between 60 and 80 m.secs. in 6 samples. average:68 m.secs	duration of stop varies between 50 and 140 m.secs. in 15 samples. average:99 m.secs.	duration of stop varies between 60 and 140 m.secs. in 12 samples. average:95 m.secs.	No samples	No samples	No samples
[k]	No samples	duration of stop varies between 80 and 145 m.secs. in 15 samples. average:107 m.secs.	duration of stop varies between 46 and 105 m.secs. in 45 samples. average:71 m.secs.	duration of stop varies between 40 and 130 m.secs. in 12 samples. average:66 m.secs.	No samples	duration of stop varies between 50 and 100 m.secs. in 9 samples. average:64 m.secs.	duration of stop varies between 60 and 72 m.secs. in 3 samples. average: 66 m.secs.

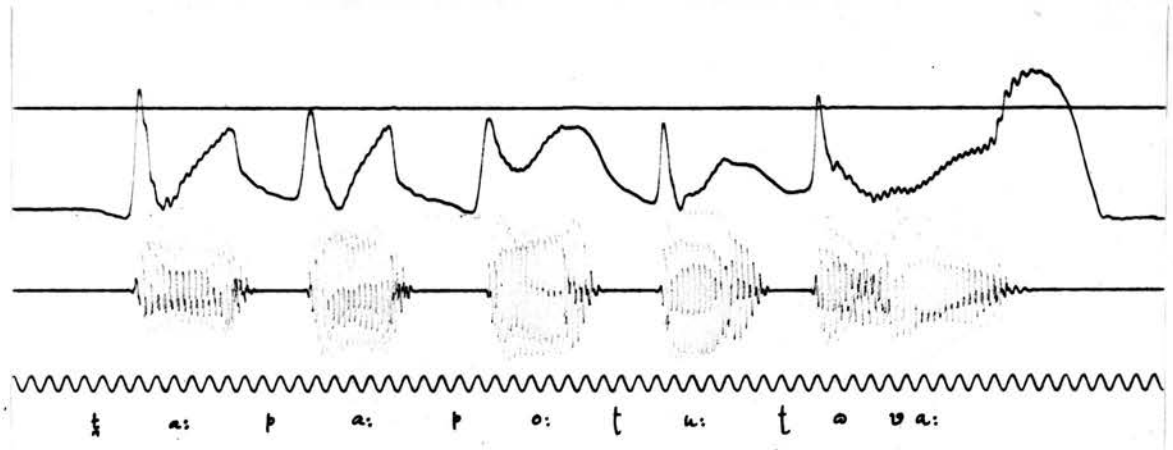
Duration of Orthographic single and double stops.



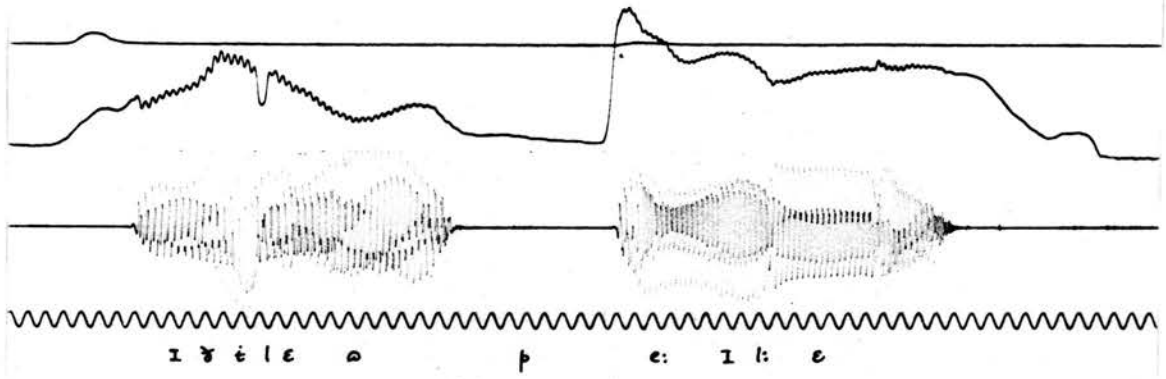
Kgm. 91 (I am packing my luggage.)



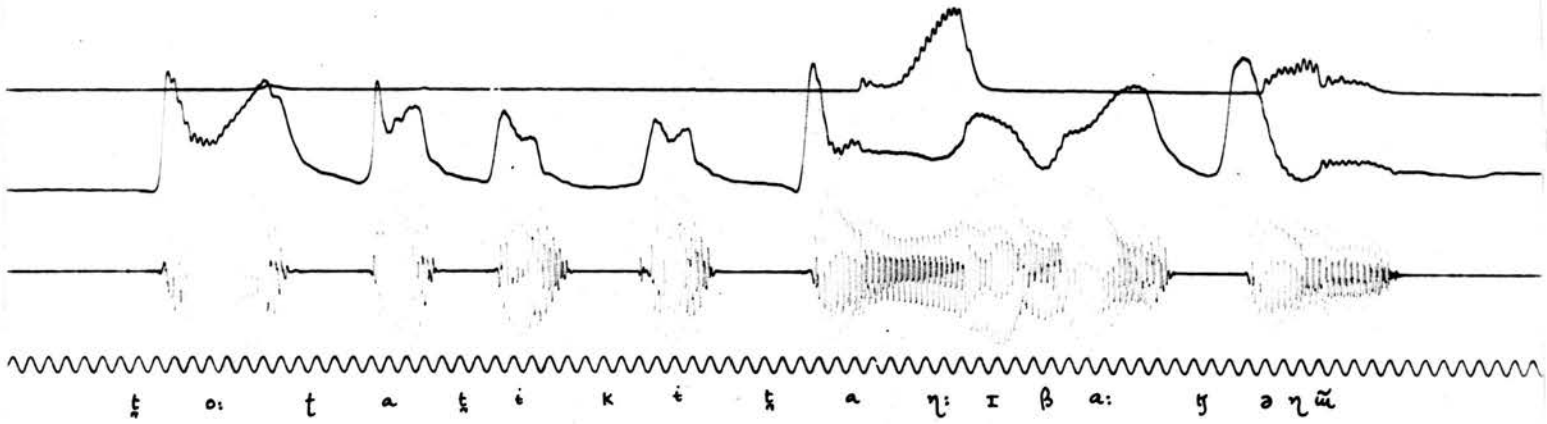
Kgm. 92 (There are no green grams in the vessel.)



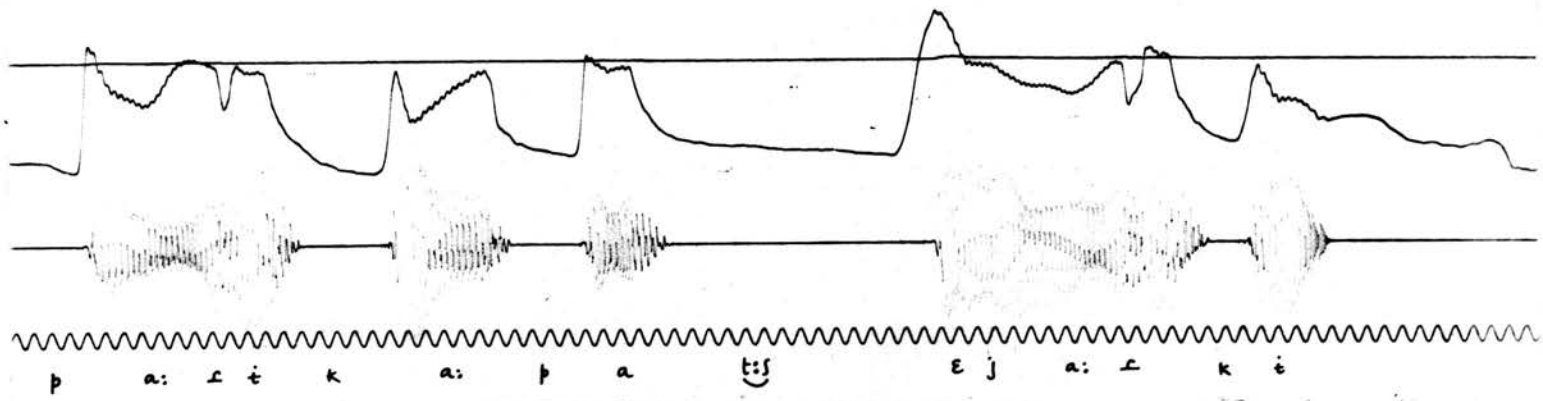
Kgm. 93 (Bolt the door and come.)



Kgm. 94 (There is absolutely no salt in this.)



Kgm. 95 (I must water the plants in the garden.)



Kgm. 96 (The bitter-gourd is very green.)

Duration of Orthographic single and double stops.

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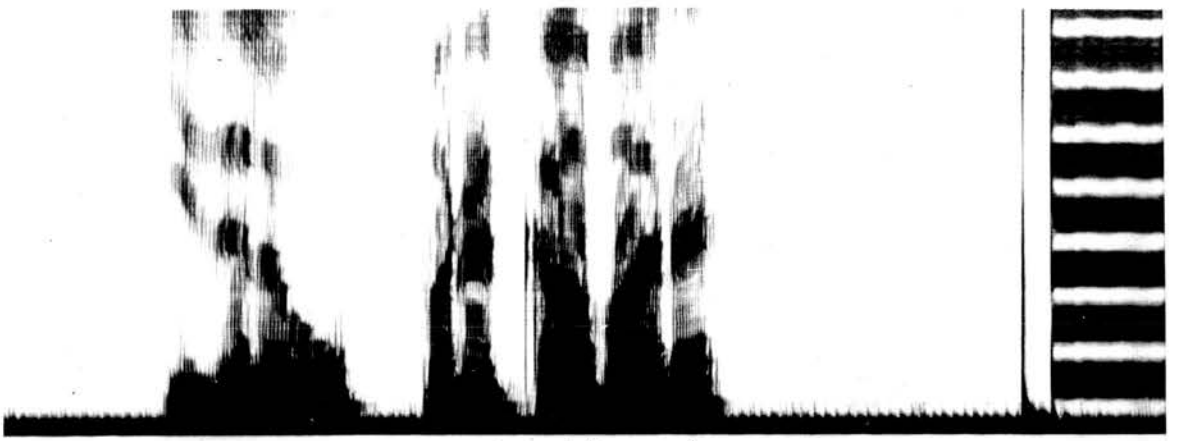
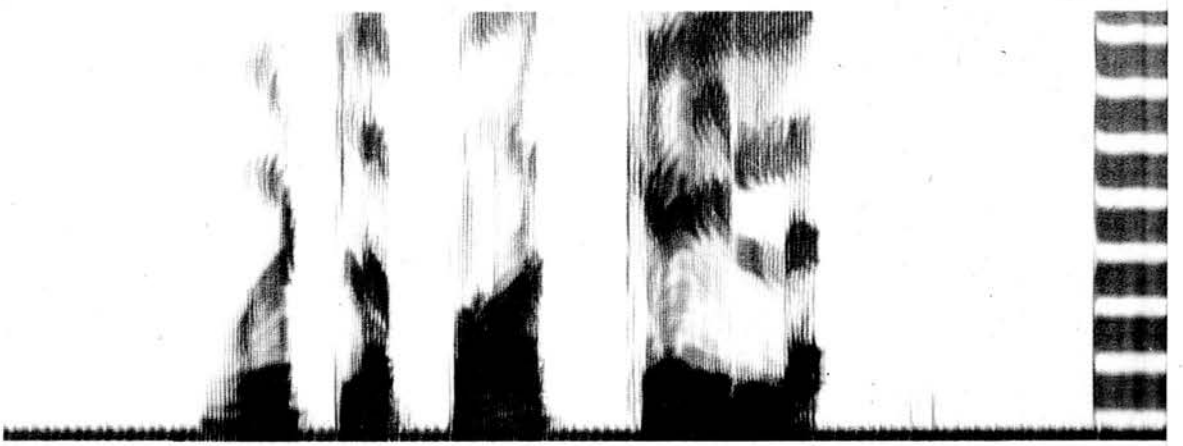


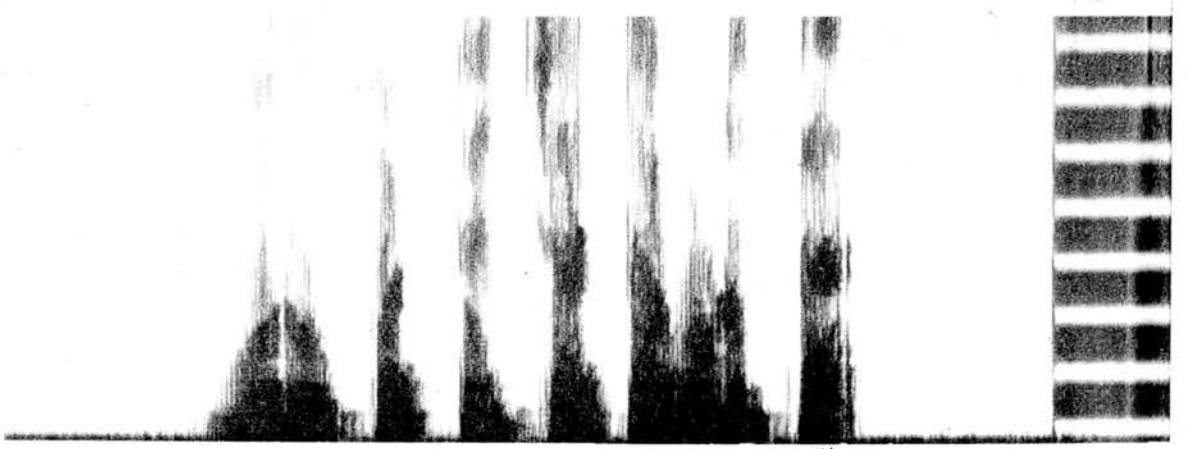
ɪʒtlɛ ɑ pː ɪɾɛkɑːβɑːɾt

TYPE B/65-50 SONAGRAM KAY ELECTRIC CO. PINE BROOK, N. J.



ɒtːtlɛpɑːkːɛːɪːɛ

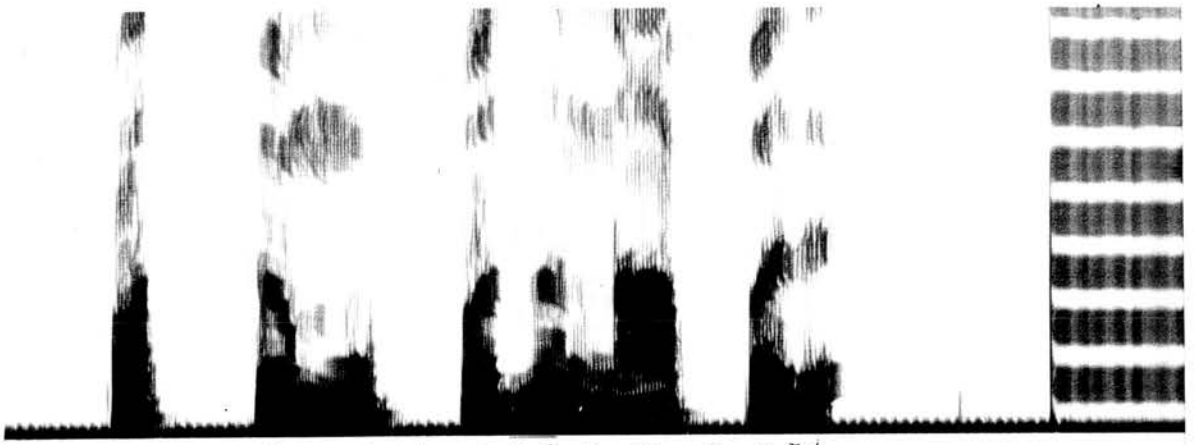
TYPE B/65-50 SONAGRAM KAY ELECTRIC CO. PINE BROOK, N. J.



ʍoɾɑpatʧatɛɦɑɣɑtɛ̃

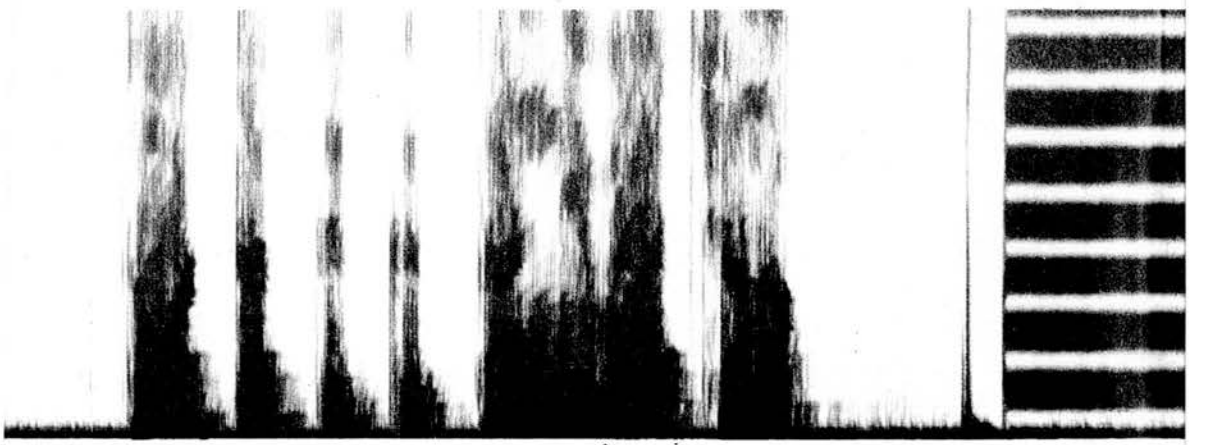
Duration of Orthographic single and double stops (contd.)

TYPE B/65-50 SONAGRAM KAY ELECTRIC CO. PINE BROOK, N. J.



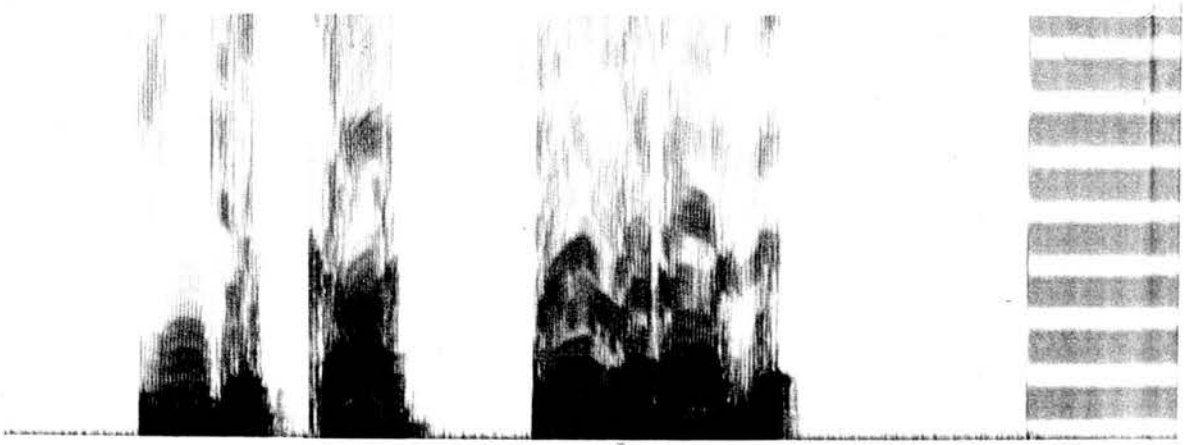
p a t̪ ɯ̃ m ɑ̃ p a ɾ ɯ̃ n a: p ɔ ɾ t

TYPE B/65-50 SONAGRAM KAY ELECTRIC CO. PINE BROOK, N. J.



t̪ o: t̪ a t̪ i k i t̪ a ɳ: ɪ β a: ʊ ə ɳ ɯ̃

TYPE B/65-50 SONAGRAM KAY ELECTRIC CO. PINE BROOK, N. J.



ɪ ŋ g ɛ k a: t̪ e: ʋ a ɾ a ɾ i

5.20 If we compare Table 15 and Table 16 we see that the results obtained from a kymographic and spectrographic analysis of connected speech are similar to the results obtained from a kymographic study of words said in isolation. We see that:

(a) In disyllabic words the duration of the orthographically doubled stop is quite long, if the stop is preceded by a short vowel. The duration is less if the stop is preceded by a long vowel.

(b) In trisyllabic and polysyllabic words the duration of the orthographically doubled stop is shorter than in the previous case.

(c) The duration of a stop that is orthographically represented by a doubled symbol is not considerably different from that of a stop that is orthographically represented by a single symbol.

(d) The word-initial stop that is doubled in writing down connected prose is not considerably longer in duration than the one which is not doubled orthographically.

(e) This lack of consistency, one feels, is because of the difference in the emphasis given to different words in a sentence. The duration of the stops in the words [ɷp:e:], [kʻɑ:t̪:e:] and [pʻɑ:k:e:] in sentences 18, 19 and 24 in Appendices IIIa and IIIb is very long. This is

because in sentences like "There is absolutely no salt in this", "you get absolutely no breeze here" and "there are absolutely no arecanuts at home", the words meaning "salt", "breeze" and "arecanuts" are bound to receive much more emphasis than the other words in the sentences owing to the fact that the words have to convey the total absence of the commodity referred to, there being no special word used in the sentences to indicate "absolutely".

(f) In many of the sentences we have analysed above, the word-initial stop is not pronounced as a voiceless stop at all if the orthography does not double it in writing down connected prose. See, for example, sentence 7 in appendices IIIa and IIIb. In sentence 7 we have the expression [pʻoːʈʻɪβaɽɨkʻɛ] (luggage - literally "suitcase and bedding"). The two words that form this expression are [pʻoʈːɪ] (suitcase) and [pʻaɽɨkʻɛ] (bedding). In writing down the two words together, the p of [pʻaɽɨkʻɛ] is not doubled and in speech it is [β] and not [p]. Similarly, in sentence 3 we have the expressions "a shirt" and "I gave". The two words in isolation are [ɕaʈːɛ] and [kʻɑɽɑʈʻɛ̃] respectively. In writing down these two words together in connected prose, the orthographic symbol

representing the initial [k] of the second word is not doubled and the two words, in connected speech, are pronounced [ɸaʈ·ɛɦɷɽɷʈ̪·ɛ̃].

5.21 In words said in isolation we observed that what is represented in the orthography by a single stop symbol in intervocalic position is <u>never</u> a voiceless stop in speech and that what is represented in the orthography by a double stop symbol in intervocalic position is <u>always</u> a voiceless stop (see kymograms 69 - 90). We observe the same phenomenon in connected speech, too. If the word initial stop is not orthographically doubled in writing down a bit of connected prose, it is not usually a voiceless stop in speech, unless a pause intervenes between this word and the one preceding it. Otherwise it is a voiced fricative (or flap). Another striking factor is that what is orthographically doubled is always a voiceless stop in speech, however short the duration of closure may be.

5.22 All this goes to prove that the doubling of stops in intervocalic position is just an orthographic device to signal the voicelessness of the consonant and to indicate that the consonant is a stop. This inevitably is due to the fact that the orthography has one symbol to represent the voiceless stop, the voiced stop and the voiced fricative (or flap) of a series.

5.23 To illustrate this still further, a minor experiment was carried out. About a hundred English words with intervocalic voiceless stops and voiced stops were chosen. The words were sent to several Tamil speakers in India and given to some Tamil speakers in Edinburgh, including one who is a native speaker of English, but has attained mastery in Tamil. They were asked to transliterate the English words using Tamil orthography. Eleven out of twelve people transliterated intervocalic voiceless stops in English using a double symbol, irrespective of English spelling and used a single symbol to indicate the voiced stops in intervocalic position. A few of these are given below:

English word	Transliterated version.
paper	pe:ppaɾ
pepper	peppaɾ
bakery	pe:kkaɾi
shooting	ʂu:ʈʈiŋ
table	ʈe:biɭ
pudding	puʈiŋ
coding	ko:ʈiŋ
coating	ko:ʈʈiŋ
ladder	la:ʈaɾ
later	le:ʈʈaɾ
letter	leʈʈaɾ
butter	paʈʈaɾ

5.24 These transliterations and the voiceless pronunciation of orthographically doubled stops indicate that a doubled stop symbol instinctively makes a Tamil speaker realize that voicelessness of the consonant in question and of its being a stop consonant.

5.25 We may therefore conclude that in Tamil it is not the doubling or gemination that is significant at the phonetic level as far as voiceless stop consonants are concerned. Rather, the distinction is one of voicelessness and voicing on the one hand and between "stop" and "non-stop" consonant on the other.

Chapter VI

Aspiration of Voiceless Stops.

Chapter VI

6 Aspiration of voiceless stops.

6.1 General discussion of aspiration:-

6.1.1 Discussing aspiration of voiceless stops in English, Daniel Jones (1969 ed., 138) says: "In southern English when [p] is followed by a stressed vowel as in pardon ['pɑ:dn], payment ['peimənt], it is pronounced with considerable force and a noticeable puff of breath or 'aspiration' (i.e., a slight [h]) is heard after the explosion of the [p] and before the beginning of the vowel".

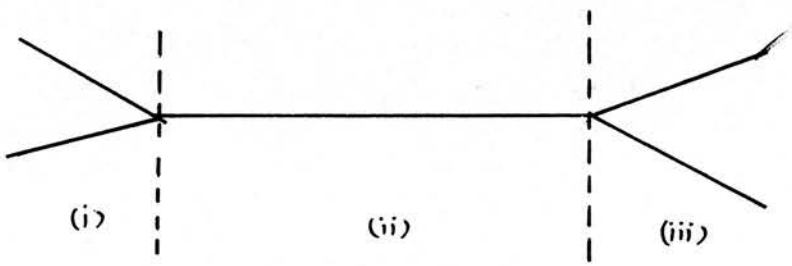
6.1.2 Abercrombie (1967, 140) distinguishes three phases in the articulation of a stop consonant:

(i) the shutting phase

(ii) the closure phase

(iii) the opening phase

Abercrombie's diagram illustrating the three phases is reproduced below:-



6.1.3 Discussing aspiration of voiceless stops, he says: ".. we must consider the co-ordination of the states of the glottis with the different phases of a stop. If the glottis is open during phase ii, the stop is called voiceless... If voicing does not set in until after phase iii is completed, the plosion itself will be voiceless and the stop is said to be voiceless aspirated. If, however, voicing starts simultaneously with the beginning of phase iii, then the plosion is voiced and the stop is termed voiceless unaspirated. Aspiration, in other words, is a period of voicelessness that follows the voiceless closure phase of a stop." [1] Two diagrams are reproduced below from Abercrombie (1967, 149) which make clear the relationships of stops with the states of the glottis.

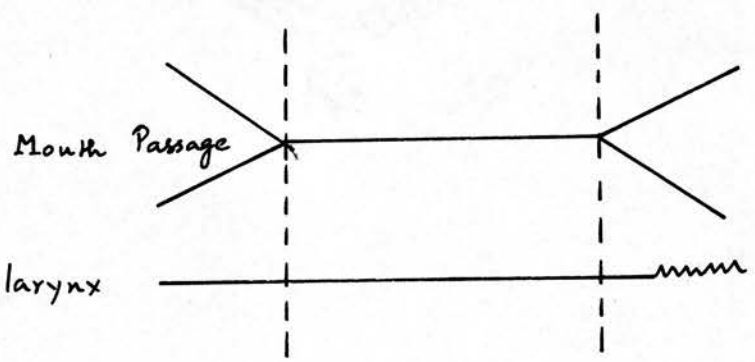


Figure 1 Voiceless aspirated

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1. Abercrombie, D. (1967, 148)

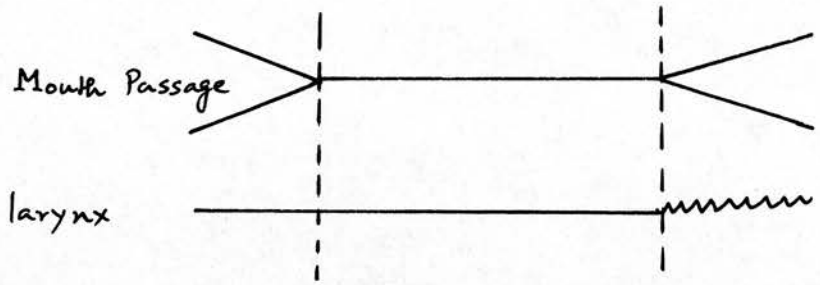

Figure 2 Voiceless unaspirated

6.1.4 In Figure 1 which represents the three phases of a voiceless aspirated stop and the states of the glottis during the three phases, we find that voicing (vibration of the vocal cords which is indicated by a spiky line) sets in after phase iii of the stop is completed. In Figure 2 which represents the three phases of a voiceless unaspirated stop and the states of the glottis during the three phases, we find that voicing sets in simultaneously with phase iii of the stop.

6.2 Aspiration in the voiceless stops of Tamil:-

6.2.1 With this definition of aspiration in mind, (i.e., "a period of voicelessness that follows the voiceless closure phase of a stop") let us turn our attention to the voiceless stops of the dialect of Tamil under survey. Several writers on the phonetics/phonology of Tamil have referred to this phenomenon, but their remarks are in the form of casual remarks made in passing. Meenakshisundaran (1965, 194-200)

discusses the Tamil of the twentieth century [2] but he has not referred to aspiration of voiceless stops at all. Fowler (1954) claims to discuss a variety of Tamil that is similar to the present writer's, but he does not say anything about aspiration either.[3]

6.2.2 Firth (1934) discusses the aspiration of voiceless stops in Tamil [4] and he says of /p/:- "Initially as in English with slightly less aspiration when followed by short vowels and more when followed by long vowels, especially uu. When followed by uu it is frequently affricated, e.g., [pɸuunai] (cat) ... /pp/ is always ... energetically articulated, but without aspiration". [5] Firth does not mention whether word-initial [t̪] or intervocalic [t̪:] (orthographic t̪t̪) is

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2. Meenakshisundaran has given what he calls an overall pattern of the phonemic structure of Tamil, but he hastens to add that "it should not be taken that the phonemic structure given characterizes all the dialects of Tamil Land...They [i.e., the phonemes of 'Modern Tamil'] represent the overall pattern of the various dialects within Madras State and Ceylon" (1965, 204-205).
3. The title of Fowler's paper suggests that the dialect he has surveyed is similar to that of the present writer, but he has actually examined an extremely artificial type of Tamil - his informant was a Professor of Tamil Literature.
4. Firth does not mention explicitly the dialect of Tamil that he has analysed, though he does say that it is a sketch of the pronunciation of Tamil "based on a phonetic analysis of the pronunciation of several educated Tamilians" (page i). On going through his analysis one finds that it is the literary variety of Tamil, spoken only on extremely formal occasions, that Firth has taken up for analysis.
5. Firth, J.R. (1934, iv - v)

aspirated or not. About aspiration of the retroflex stop, Firth says: "ʈʈ- a double or 'long' voiceless retroflex stop ... Great care should be taken not to aspirate ʈʈ..." [6] About the voiceless velar stop [k], Firth says: "Initially, a voiceless slightly aspirated velar stop as in the English cool, card.." [7] According to Firth, therefore, word-initial [p] and [k] are pronounced with slight aspiration and intervocalic [p:] and [ʈ:] are pronounced without aspiration. No mention is made, however, of aspiration or lack of it with regard to initial [t̪], intervocalic [t̪:] and intervocalic [k:].

6.2.3 Masica, Krishnaswamy and Chaturvedi (1963) touch upon the phenomenon of aspiration. They say: "...it is not necessary to indicate aspiration when comparing English with Tamil, which roughly parallels English in the automatic aspiration of initial voiceless stops". [8]

6.2.4 Bright and Ramanujan (1961) observe: "The voiceless occlusives are fortis; /c/ is an affricate, the rest are stops. When they are followed by long vowels, they are somewhat aspirated". [9]

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6. Firth, J.R. (1934, ix).
7. Firth, J.R. (1934, ix).
8. Masica, Krishnaswamy and Chaturvedi (1963, 65). It should be mentioned here that the dialect they have discussed is the "Tamil of educated non-brahmins in Madras city" (page 66) which is also referred to as "educated spoken non-brahmin Tamil of Madras and adjacent districts". (page 67).
9. Bright and Ramanujan (1961, 21)

6.2.5 Albert (1966) criticises Firth (1934) on many points. About Firth's statement regarding aspiration of voiceless stops, Albert says: "nous dirons cependant que Firth semble décrire plus particulièrement un dialecte brahminique,[10] donc minoritaire et pour ainsi dire marginal. Dans les dialectes, en effet, la spirantisation des occlusives est en général plus marquée, mais peut-être pas au point cependant de percevoir des [p^h], [p^Φ], [k^h] initiaux ou des [ð] de type anglais".[11]

6.2.6 Troubetzkoy (1949,159) says: "Il ya dans cette langue [Tamil] cinq phonèmes bruyants qui sont réalisés différemment selon l'entourage phonétique: à l'initiale comme occlusives aspirées (p^h, t^h, $ṭ^h$, k^h, c^h), à l'intérieur du mot après voyelle comme spirantes (β, ɓ ɗ comme sonores, x, ç la plupart du temps comme sourdes), après nasale comme occlusives sonores (b,d,ḍ,g,j) et après ɣ comme occlusives sourdes non aspirées (p,t,ṭ,k,c)".[12]

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10. Albert is wrong here. Firth is NOT describing a brahmin dialect of Tamil.
11. Albert (1966,95). A rough English translation of this quotation would be: "we should point out, however, that Firth appears to be describing more particularly a brahmin dialect, in a minority distribution and therefore, one could say,marginal. In these dialects, in fact, the affrication is generally more marked, but not perhaps to the degree of there being perceivable [p^h], [p^Φ], [k^h] initially,or [ð] as in English".
12. An English translation of the quotation would be: "There are in this language [Tamil] five obstruent phonemes which are realized differently according to their phonetic environment: in initial position as aspirated stops [p^h,t^h, $ṭ^h$, k^h,c^h), in medial post-vocalic as fricatives (β, ɓ, ɗ voiced, X, ç for the greater part of the time voiceless), after a nasal as voiced stops (b,d,ḍ,g,j) and after ɣ as voiceless unaspirated stops (p,t,ṭ,k,c)..."

6.2.7 Kuno (1958, 49-50) points out: "In word-initial, slightly aspirated voiceless allophones [p,t,k] occur.. In the so-called double consonants, unaspirated voiceless allophones ... occur".[13]

6.2.8 We have thus various opinions regarding whether or not the voiceless stops in Tamil are pronounced with aspiration. The authors referred to above have no doubt analysed various dialects of Tamil (regional, communal, literary-formal, etc., - see 1.3 to 1.5, particularly 1.5.8) that are different in many respects from the one the present writer has taken for analysis. But the present writer has come across speakers of various dialects of Tamil and he feels that there is no appreciable difference between dialects as far as aspiration of voiceless stops is concerned. The present writer himself, depending purely upon his proprioception, pointed out in 1970 [14] that word-initial voiceless stops are slightly aspirated.

6.2.9 Motivated by the contradictory nature of some of the remarks that have so far been made on the aspiration of voiceless stops in Tamil and singularly struck by the fact that even the more recent of the works referred to above do not have any kind of instrumental evidence in justification of their claims,

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13. Kuno describes what he calls "spoken Tamil in Jaffna, which is considered as the standard Tamil in Ceylon". (page 41).

14. Balasubramanian (1970).

the present writer attempted to investigate this phenomenon in his dialect of Tamil. Kymograms were made of several Tamil words with voiceless stops in word-initial position, medial non-intervocalic position and in medial intervocalic position. With simultaneous mouth and larynx tracings and with time marked in cycles per second, the period of voicelessness after the plosion of the stop, i.e., after phase iii of the stop, was measured in each case. In order to be able to make any pronouncement on the basis of the findings, a few kymograms were made of English, Hindi[15] and Kannada[16] words. We know from descriptions of English (R.P.) by phoneticians like Daniel Jones that in southern English aspirated voiceless stops occur in stressed syllables.[17] In Hindi and Kannada aspirated voiceless stops phonemically contrast with their unaspirated counterparts. The kymograms of these English, Hindi and Kannada words were examined and the period of voicelessness after the release phase of the voiceless stop was measured in each case. The tabulated results were then compared.[18]

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15. an Indo-European language spoken in India.
16. a Dravidian language spoken in South India.
17. The occurrence of aspirated voiceless stops in English is discussed here very roughly.
18. The English, Hindi and Kannada words were said by native speakers of the three languages. The present writer is indebted to Dr. R.E.Asher and Mr. L.A.Iles (English), Dr. B.P.Sinha (Hindi) and Dr. M.Belliappa (Kannada). Dr. Belliappa is a bi-lingual, speaking Coorgi and Kannada with equal fluency.

6.2.10 Detailed results of the kymographic analysis of Tamil words in isolation and in connected speech are given in Appendices IVa and IVb respectively. Two Summary Charts of the results - one of words said in isolation and the other of connected speech - are given here, followed by a few of the kymograms made for purposes of this analysis.

Table 17:- Aspiration of voiceless stops in words said in isolation - Tabulated results and Summary.

stop consonant	Word-initial stop followed by a short vowel	Word-initial stop followed by a long vowel	Word-medial stop	Intervocalic stop (orthographic double stop)
[p]	samples checked: 120 Period of voicelessness after release phase of stop:- 0 m.secs. ... 1 sample 3 " ... 1 sample 5 " ... 13 samples 8 " ... 1 sample 10 " ... 30 samples 13-15 " ... 40 samples 18-20 " ... 16 samples 23-25 " ... 12 samples 30 " ... 6 samples In 71 out of the 120 samples checked, the period of voicelessness ranges between 8 and 15 m.secs. We may say that word-initial [p] followed by a short vowel is slightly aspirated.	samples checked: 75 Period of voicelessness after release phase of stop:- 0 m.secs. ... no samples 3-5 " ... 10 samples 8-10 " ... 20 samples 13-15 " ... 26 samples 18-20 " ... 6 samples 23-25 " ... 6 samples 30 " ... 6 samples 35 " ... 1 sample In 46 out of the 75 samples checked, the period of voicelessness ranges between 8 and 15 m.secs. No considerable difference is observed between initial [p] followed by a long vowel and initial [p] followed by a short vowel. Initial [p] followed by any vowel can therefore be said to be slightly aspirated.	samples checked: 30 Period of voicelessness after release phase of stop:- 0 m.secs. ... 17 samples 3-5 " ... 9 samples 8-10 " ... 4 samples In 17 out of the 30 samples checked, there is no aspiration at all - the vocal cords start vibrating simultaneously with the release phase of the stop. In 9 more samples, there is a negligibly short period of voicelessness (3-5 m.secs.) after the stop is released. 4 more samples reveal a period of voicelessness between 8 and 10 m.secs. It is therefore concluded that word-medial [p] is unaspirated.	samples checked: 78 Period of voicelessness after release phase of stop:- 0 m.secs. ... 40 samples 3-5 " ... 25 samples 8-10 " ... 13 samples In 40 out of the 78 samples checked, there is no aspiration at all. In 25 more samples, there is a negligibly short period of voicelessness (3-5 m.secs.) after the stop is released. In 13 other samples, the period of voicelessness ranges between 8 and 10 m.secs. Since in more than 50% of the samples there is no aspiration at all and in the other samples the aspiration is negligible, we may say that the Intervocalic stops [p·] and [p:] are unaspirated.
[t̪]	samples checked: 36 Period of voicelessness after release phase of stop:- 0 m.secs. ... No samples 5 " ... 6 samples 8-10 " ... 21 samples 13-15 " ... 8 samples 20 " ... 1 sample In 21 out of the 29 samples checked, the period of voicelessness ranges between 8 and 15 m.secs., a phenomenon we observed in [p] followed by a short vowel in word-initial position. We may say, then, that word-initial [t̪] followed by a short vowel is also slightly aspirated.	samples checked: 39 Period of voicelessness after release phase of stop:- 0 m.secs. ... no samples 5 " ... 4 samples 8-10 " ... 12 samples 13-15 " ... 17 samples 18-20 " ... 5 samples 25 " ... 1 sample In 29 out of the 39 samples checked, the period of voicelessness ranges between 8 and 15 m.secs. No considerable difference is observed between initial [t̪] followed by a short vowel and initial [t̪] followed by a long vowel, a phenomenon we saw in the case of initial [p]. Initial [t̪] can therefore be said to be slightly aspirated, whether followed by a short or long vowel.	samples checked: 24 Period of voicelessness after release phase of stop:- 0 m.secs. ... 6 samples 3-5 " ... 15 samples 8-10 " ... 3 samples In 21 out of the 24 samples checked, the period of voicelessness ranges between 0 m.secs. and 5 m.secs., too negligible to be called aspiration. Like medial [p], medial [t̪] can be said to be unaspirated.	samples checked: 63 Period of voicelessness after release phase of stop:- 0 m.secs. ... 28 samples 3-5 " ... 27 samples 8-10 " ... 8 samples In 28 out of the 63 samples checked, there is no aspiration at all and in 27 more samples, there is a negligibly short period of voicelessness (3-5 m.secs.), a feature we observed in the case of intervocalic [p·] or [p:]. Like intervocalic [p·] or [p:], therefore, intervocalic [t̪·] or [t̪:] can be considered unaspirated.

Table 17:- Aspiration of voiceless stops in words said in isolation (cont).

stop consonant	Word-initial stop followed by a short vowel	Word-initial stop followed by a long vowel	Word-medial stop	Intervocalic stop (orthographic double stop)
[t̪] and [t]	samples checked: 24 Period of voicelessness after release phase of stop:- 0 m.secs. ... 21 samples 5 " ... 3 " In 21 out of the 24 samples checked there is no aspiration at all. We may therefore conclude that word-initial [t̪] followed by a short vowel is unaspirated.	samples checked: 24 Period of voicelessness after release phase of stop:- 0 m.secs. ... 13 samples 3-5 " ... 10 " 8 " ... 1 " In 13 out of the 24 samples checked there is no aspiration at all, while 10 other samples reveal a period of voicelessness ranging between 3 and 5 m.secs., which can be considered negligible. We may therefore conclude that word-initial [t̪] followed by a long vowel is unaspirated.	samples checked: 15 Period of voicelessness after release phase of stop:- 0 m.secs. ... 13 samples 3-5 " ... 2 " In 13 out of the 15 samples checked there is no aspiration at all. Like [p] and [t̪], therefore, medial [t̪] and [t] are unaspirated.	samples checked: 84 Period of voicelessness after release phase of stop:- 0 m.secs. ... 79 samples 3-5 " ... 5 " We come across a striking phenomenon. In 79 out of the 84 samples checked, there is no aspiration at all. In [p] and [t̪] in intervocalic position, out of the 141 samples checked, 68 revealed no aspiration, but 73 revealed some period of voicelessness which we chose to consider negligible.(we find a similar phenomenon with intervocalic [k·] or [k:]. see later). It is possible that with careless pronunciation intervocalic [p·], [p:],[t̪·], [t̪:], [k·] and [k:] are very slightly aspirated. But intervocalic [t̪·] and [t̪:] are never aspirated. Also see Firth (1934, ix).
[k]	samples checked: 106 Period of voicelessness after release phase of stop:- 0 m.secs. ... 28 samples 3-5 " ... 13 " 8-10 " ... 40 " 13-15 " ... 19 " 18-20 " ... 6 "	samples checked: 54 Period of voicelessness after release phase of stop:- 0 m.secs. ... 18 samples 3-5 " ... 8 " 8-10 " ... 17 " 13-15 " ... 9 " 18-20 " ... 2 "	samples checked: 24 Period of voicelessness after release phase of stop:- 0 m.secs. ... 14 samples 3-5 " ... 3 " 8-10 " ... 7 "	samples checked: 45 Period of voicelessness after release phase of stop:- 0 m.secs. ... 17 samples 3-5 " ... 13 " 8-10 " ... 13 " 13 " ... 2 "

Table 17:- Aspiration of voiceless stops in words said in isolation (cont.).

stop consonant	Word-initial stop followed by a short vowel	Word-initial stop followed by a long vowel	Word-medial stop	Intervocalic stop (orthographic double stop)
[k]	We see a slightly different feature here. Whereas out of 156 samples checked with word-initial [p] and [t̪] followed by a short vowel only one showed no aspiration at all, with initial [k] followed by a short vowel, 28 out of 106 samples are totally unaspirated. 59 out of the 106 samples show a period of voicelessness ranging between 8 and 15 m.secs. and 25 others have a period of voicelessness ranging between 18 and 20 m.secs. Though on the basis of this we may say that word-initial [k] followed by a short vowel is also slightly aspirated, it should be pointed out that the aspiration of word-initial [k] followed by a short vowel is less and more spasmodic than in the case of word-initial [p] and [t̪].	Again we see that word-initial [k] followed by a long vowel is very similar to word-initial [k] followed by a short vowel and thus slightly different from word-initial [p] and [t̪] followed by a long vowel as far as aspiration is concerned. Out of 114 samples of word-initial [p] and [t̪] followed by a long vowel we did not come across one single example of zero aspiration, whereas out of 54 samples checked with word-initial [k] followed by a long vowel, 18 show no aspiration whatever. 28 samples show a period of voicelessness ranging between 8 and 20 m.secs. Though on the basis of this we may say that word-initial [k] followed by a long vowel is slightly aspirated, it should be mentioned that, like word-initial [k] followed by a short vowel, word-initial [k] followed by a long vowel too shows a slight difference from [p] and [t̪].	Fourteen out of the 24 samples checked reveal no aspiration at all and 3 more reveal a negligibly short period of voicelessness ranging between 3 and 5 m.secs. Word-medial [k] therefore, similar to word-medial [p], [t̪], [ṭ] and [t], is unaspirated.	Two-thirds of the samples checked reveal a period of voicelessness ranging between 0 and 5 m.secs. This is similar to what we observed with intervocalic [p·], [p:], [t̪·], [t:], [ṭ·] and [ṭ:]. Intervocalic [k·] and [k:] are therefore considered unaspirated.

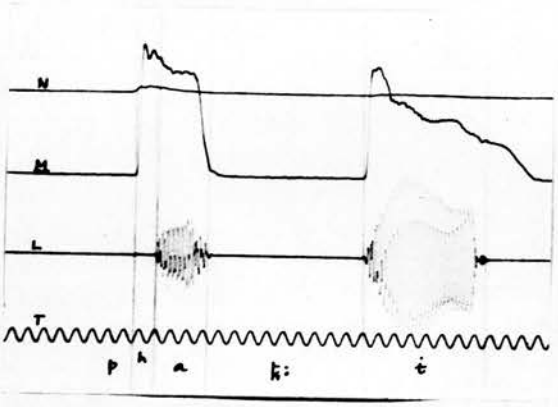
Table 18:- Aspiration of Voiceless stops in connected speech - Tabulated Results and Summary.

stop consonant	Sentence-initial stop followed by a short vowel.	Sentence-initial stop followed by a long vowel.	Word-initial stop in the middle of a sentence followed by a short vowel.	Word-initial stop in the middle of a sentence followed by a long vowel.	medial stop	Intervocalic stop (orthographic double)
[p]	samples checked: 13 aspiration:- 13 m.secs ...4 samples 15 " ...3 " 18-20" ...4 " 23 " ...1 " 30 " ...1 " In every sample checked there is slight aspiration. In 11 out of the 13 samples checked, there is a period of voicelessness ranging between 13 and 20 m. secs. Sentence-initial [p] followed by a short vowel can thus be called slightly aspirated.	Samples checked: 8 aspiration:- 10 m.secs ... 3 samples 13 " ... 5 " The samples checked are too few to say anything categorical, but since all the samples checked show a period of voicelessness ranging between 10 and 13 m.secs., sentence-initial [p] followed by a long vowel can also be said to be slightly aspirated.	samples checked: 14 aspiration:- 0 m.secs ...2 samples 5 " ...2 " 10 " ...10 " In 12 out of the 14 samples checked, there is slight aspiration, though less than in words said in isolation. Word-initial [p] in the middle of a sentence can also be considered slightly aspirated.	samples checked: 16 aspiration:- 5 m.secs ..2samples 10 " ..11 " 15 " ..3 " In 14 out of the 16 samples checked, there is slight aspiration. Word-medial [p] in the middle of a sentence can thus be considered slightly aspirated.	samples checked: 6 aspiration:- 0 m.secs .. 1 sample 5 " .. 1 " 10 " .. 4 " The samples checked are too few to say anything definite. Since in words said in isolation medial [p] was considered unaspirated, medial [p] in connected speech is also considered unaspirated.	samples checked: 26 aspiration:- 0 m.secs ..3 samples 5 " ..5 " 10 " ..17 " 15 " ..1 " Aspiration of intervocalic [p·] and [p:] in connected speech is similar to that in words said in isolation. The one sample in which there is an aspiration of 15 m.secs. is the word [ɷp:e:] in the sentence "There is absolutely no salt in this", with very heavy emphasis on the second syllable of the word. This may be the reason for the slightly heavy aspiration in this sample. Intervocalic [p·] and [p:] in connected speech are unaspirated.
[t̪]	No samples checked	samples checked: 8 aspiration:- 5 m.secs. .. 1 sample 10 " .. 2 " 13 " .. 2 " 18 " .. 1 " 20 " .. 2 " In 7 out of 8 samples checked, there is an aspiration ranging between 10 and 20 m.secs. Sentence-initial [t̪] followed by a long vowel is therefore considered slightly aspirated	samples checked: 5 aspiration:- 5 m.secs. .. 1 sample 10 " .. 4 " There is slight aspiration, though less than in words said in isolation. Word-initial [t̪] in the middle of a sentence can also be considered slightly aspirated.	samples checked: 2 aspiration:- 0 m.secs. .. 1sample 5 " .. 1 " The samples checked are too few to say anything definite.	samples checked: 8 aspiration:- 0 m.secs. .. 8 samples In all the 8 samples checked there is no aspiration at all. Medial [t̪] in connected speech is thus considered unaspirated.	samples checked: 28. aspiration:- 0 m.secs. ..8 samples 5 " ..13 " 8 " ..2 " 10 " ..5 " In 21 out of 28 samples checked there is an aspiration of between 0 and 5 m.secs. Intervocalic [t̪·] and [t̪:] in connected speech are unaspirated.

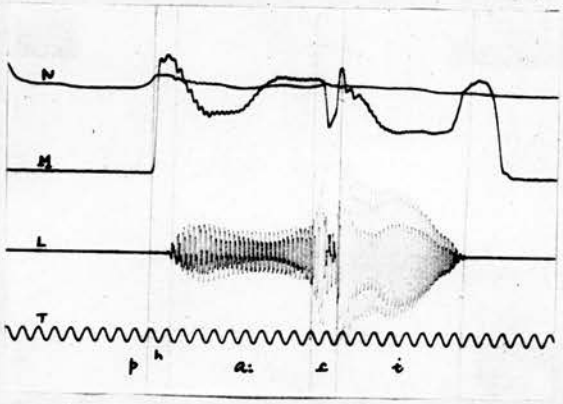
Table 18:- Aspiration of voiceless stops in connected speech (contd.)

stop consonant	Sentence-initial stop followed by a short vowel.	Sentence-initial stop followed by a long vowel.	Word-initial stop in the middle of a sentence followed by a short vowel.	Word-initial stop in the middle of a sentence followed by a long vowel.	medial stop	Intervocalic stop (orthographic double stop)
[t] and [t̲]	No samples checked	No samples checked	No samples checked	No samples checked	samples checked: 8 aspiration:- 0 m.secs. ..8 samples As in words said in isolation, in connected speech too, medial [t] and [t̲] are unaspirated.	samples checked: 22 aspiration:- 0 m.secs. ..20 samples 5 " .. 2 " As in words said in isolation, in connected speech too, intervocalic [t·] and [t:] are unaspirated.
[k]	Samples checked: 9 aspiration:- 0 m.secs. ..2 samples 8 " ..4 " 10 " ..1 " 15 " ..2 " In 7 out of 9 samples, there is aspiration ranging between 8 and 15 m.secs. Sentence-initial [k] can thus be considered slightly aspirated.	No samples checked	Samples checked: 4 aspiration:- 5 m.secs. .. 2 samples 15 " .. 2 " The samples checked are too limited to say anything definite.	Samples checked: 2 aspiration:- 10 m.secs. .. 2 samples The samples checked are too limited to say anything conclusive.	Samples checked: 8 aspiration:- 0 m.secs. ..3 samples 5 " ..3 " 10 " ..2 " From the limited samples checked, we may say that medial [k] in connected speech is unaspirated.	Samples checked:35 aspiration:- 0 m.secs. ..12 samples 5 " ..11 " 10 " ..10 " 20 " ..2 " The 2 samples in which there is a 20 m.secs. period of voiceless are the same word [ca:k:e:] in the sentence "There are absolutely no gunnybags in the shop next door". This slightly heavier aspiration may be due to the fact that this word has to be said with heavy emphasis. Since in 12 out of the 35 samples there is no aspiration at all and in 11 more samples, the aspiration is a negligible 5 m.secs. Intervocalic [k·] and [k:] in connected speech can be considered unaspirated.

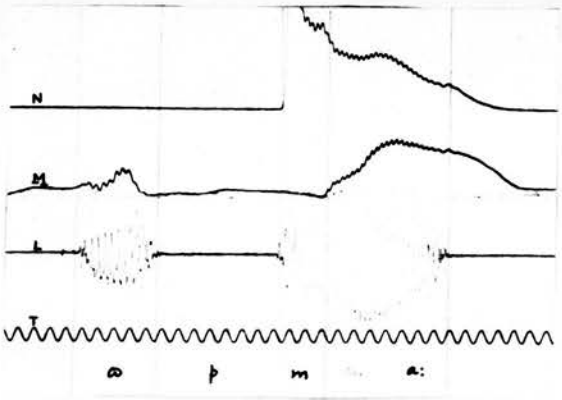
ASPIRATION OF VOICELESS STOPS.



Kgm. 97 [p'aːkːt] (ten)
Word-initial [p] followed by a short vowel.



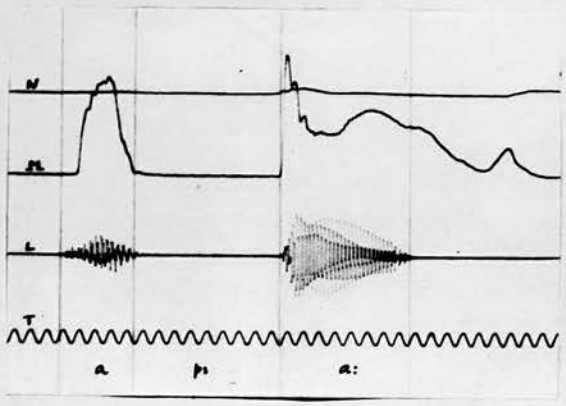
Kgm. 98 [p'aːkt] (see)
Word-initial [p] followed by a long vowel.



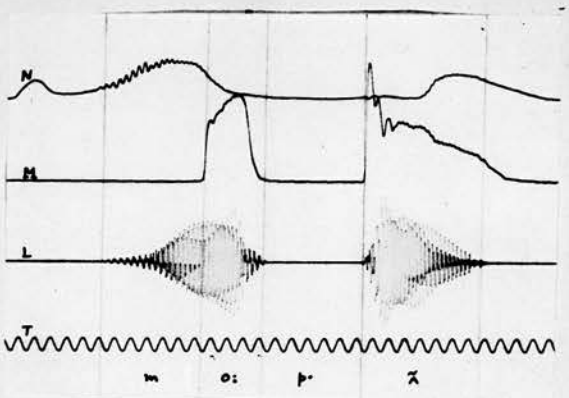
Kgm. 99 [ɶpmaː] (a savoury made with semolina)
Medial [p]

N-Nose out M- Mouth out L-Larynx T-Time (50 cps)

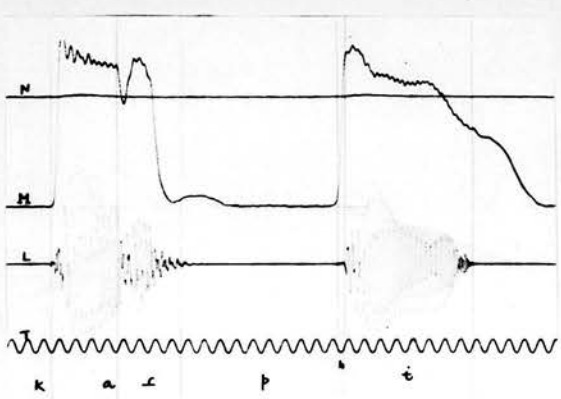
ASPIRATION OF VOICELESS STOPS (CONTD.)



Kgm. 100 [apːaɪ] (father)
Intervocalic [pː]



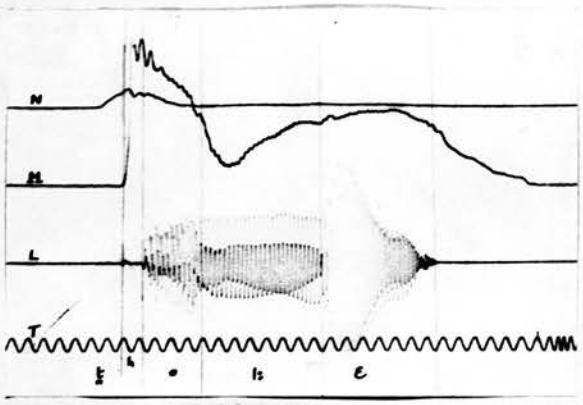
Kgm. 101 [moːpˑχ̃] (sense of smell a dog has)
Intervocalic [pː]



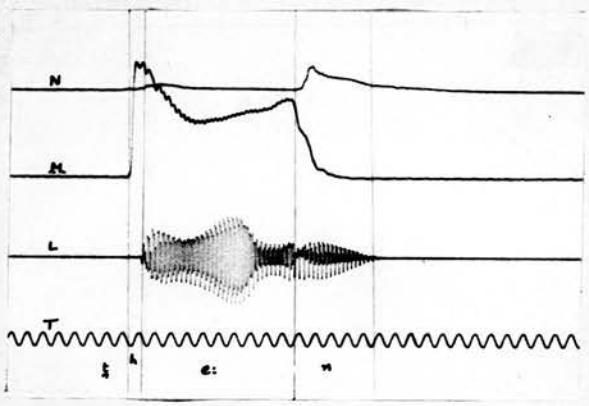
Kgm. 102 [kaɾpá] (chastity)
Medial [p]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

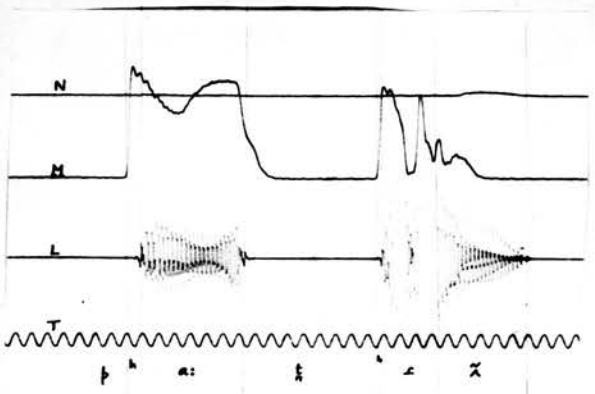
ASPIRATION OF VOICELESS STOPS (CONTD.)



Kgm. 103
[tʰolːɛ] (trouble)
Initial [tʰ] followed by a short vowel



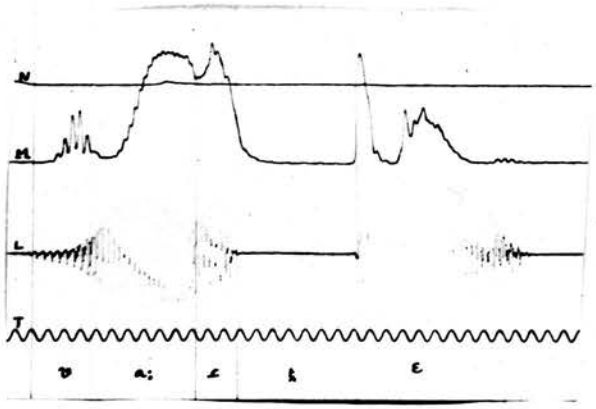
Kgm. 104 [tʰeːn] (honey)
Initial [tʰ] followed by a long vowel



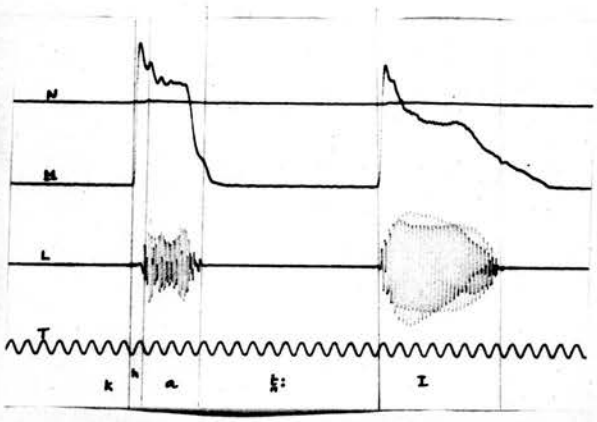
Kgm. 105 [pʰaːtʰɾx̃] (vessel)
Medial [tʰ]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

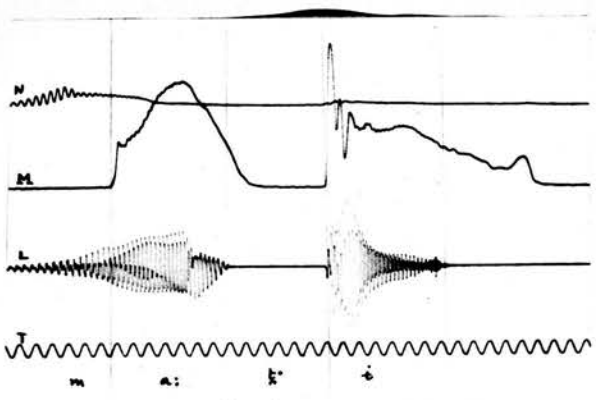
ASPIRATION OF VOICELESS STOPS (CONTD.)



Kgm. 106 [ɒa:ɾʰtɛ] (word)
Medial [ʰt]



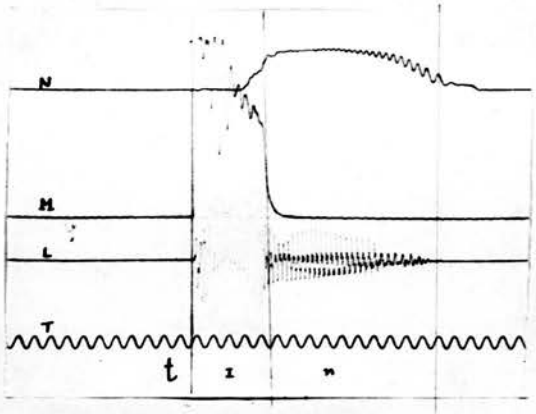
Kgm. 107 [kʰa:ʰtːɪ] (knife)
Intervocalic [ʰt:]



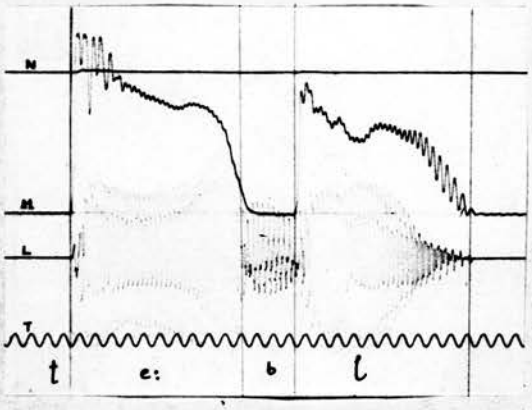
Kgm. 108 [ma:ʰt·ə] (change-imp.)
Intervocalic [ʰt·]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

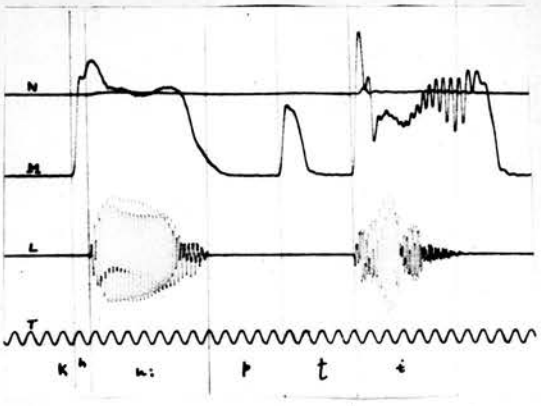
ASPIRATION OF VOICELESS STOPS (CONTD.)



Kgm. 109 [tɪn] (tin)
Initial [t] followed by a short vowel.



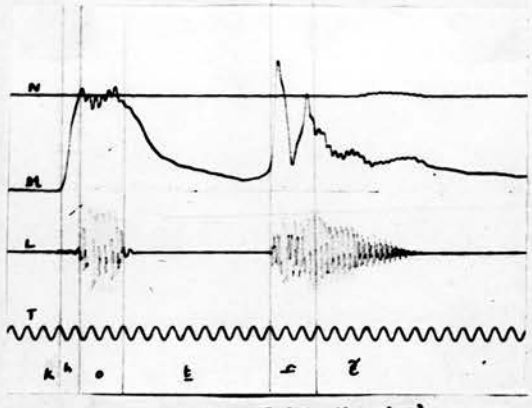
Kgm. 110 [te:b] (table)
Initial [t] followed by a long vowel.



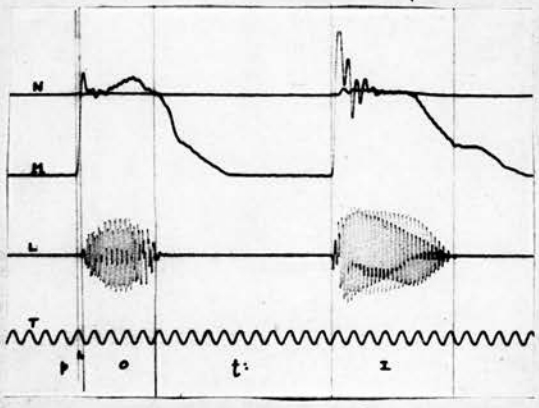
Kgm. 111 [kʰu:pʰi] (having summoned)
Medial [t]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

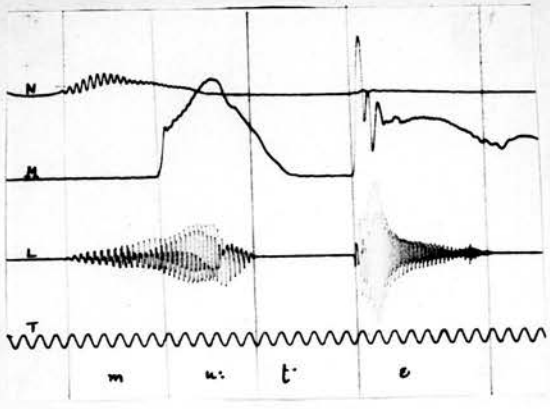
ASPIRATION OF VOICELESS STOPS(CONTD.)



Kgm. 112 [kbɨɕɛ] (I'm throwing)
Medial [t]



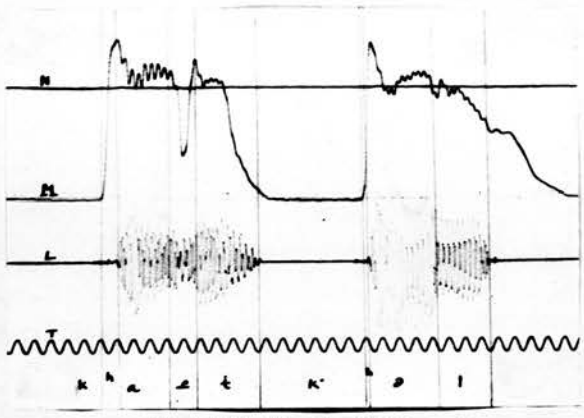
Kgm. 113 [ybtːz] (box)
Intervocalic [tː]



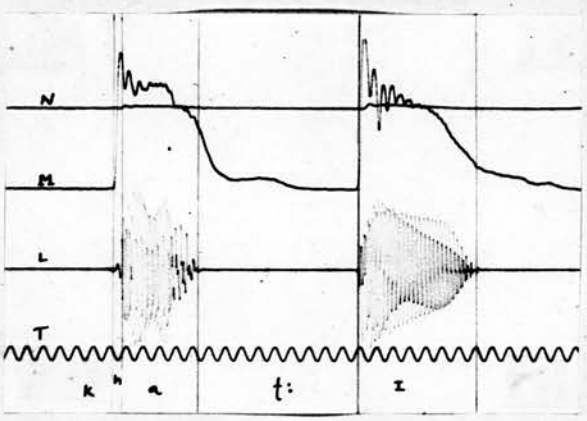
Kgm. 114 [muːtˑe] (bundle)
Intervocalic [tˑ]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

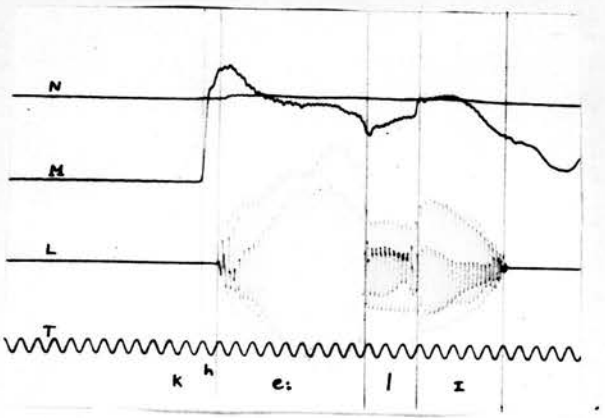
ASPIRATION OF VOICELESS STOPS (CONTD.)



Kgm. 115 [kʰaɾtkɔl] (clouds)
Initial [k] followed by a short vowel



Kgm. 116 [kʰat:ɪ] (boil-n.)
Initial [k] followed by a short vowel

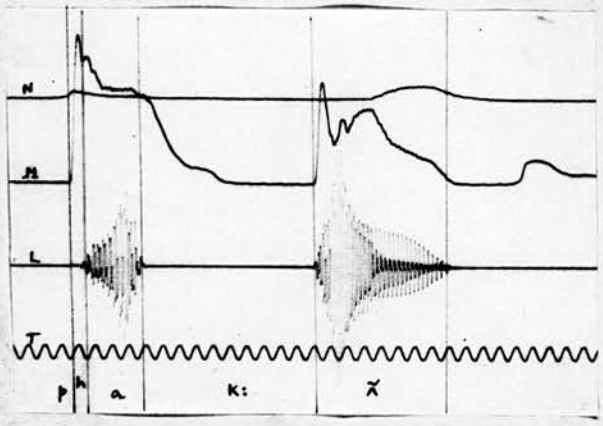


Kgm. 117 [kʰe:lɪ](fun)
Initial [k] followed by a long vowel

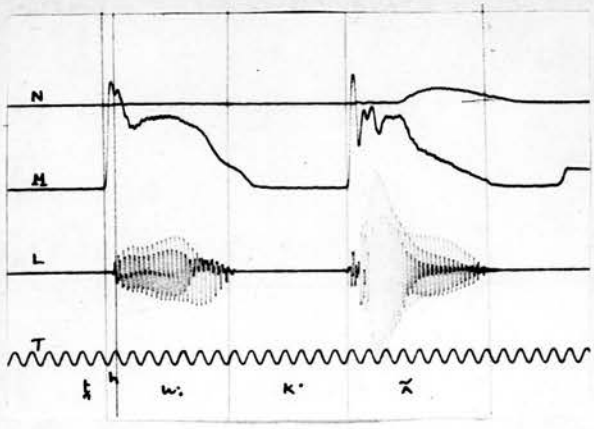
N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

ASPIRATION OF VOICELESS STOPS (CONTD.)

Kgm. 118 [akʌsmx̃](unjust)
Medial [k]



Kgm. 119 [pʰa·k:x̃] (side)
Intervocalic [k:]



Kgm. 120 [t̪ʰu:k·x̃] (sleep-n.)
Intervocalic [k·]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

6.3 General Conclusions:-

6.3.1 By measuring the period of voicelessness after the release phase of the voiceless stops in Tamil in the various phonetic environments in which they occur, we are able to come to the conclusion that:-

6.3.2 I In words uttered in isolation:-

(a) Initial [p] and [t̪] are slightly aspirated, whether they are followed by a short vowel or a long vowel, the period of voicelessness being, on a rough average, 15 m.secs.

(b) Initial [ʈ] is unaspirated.

(c) Initial [k] is slightly less aspirated than initial [p] and [t̪]. The period of voicelessness, on a rough average, is 12 m.secs. We do get examples in which initial [k] is totally unaspirated. Since in more than 58% of the samples checked there is a period of voicelessness ranging between 8 and 20 m.secs. we have chosen to call initial [k] slightly aspirated. This is so whether it is followed by a short vowel or a long vowel.

(d) Word-medial [p], [t̪], [t̲], [ʈ] and [k] are not aspirated. In the samples checked, we do get some with a very slight period of voicelessness after the stop is released, but this period is a mere negligible 5 m.secs. on a rough average. In contrast to word-initial [p], [t̪] and [k], word-medial voiceless stops can be considered unaspirated.

(e) Intervocalic [p·], [p:], [t̪·], [t̪:], [ʈ·], [ʈ:], [k·], and [k:] are mostly unaspirated, in the majority of cases checked there being no aspiration at all. In some samples we do get a period of voicelessness, averaging roughly 8 m.secs. This is so short that this can be considered negligible. Intervocalic long stops are therefore considered unaspirated. Particular mention must be made of [ʈ·] and [ʈ:]. 94% of the samples checked revealed no aspiration at all.

6.3.3 II In connected speech:-

(a) sentence-initial [p] is slightly aspirated, the average period of voicelessness in the samples checked being 18 m.secs. This is so if the sentence-initial [p] is followed by a short vowel. Sentence-initial [p] followed by a long vowel can also be considered slightly aspirated, though it is slightly less than in the case of sentence-initial [p] followed by a short vowel. When words uttered in isolation were checked, no appreciable difference was found between word-initial [p] followed by a short vowel and word-initial [p] followed by a long vowel as far as aspiration is concerned.

(b) Sentence-initial [t̪] followed by a short or long vowel is slightly aspirated.

(c) Sentence-initial [k] followed by a short or long vowel is slightly aspirated, though slightly less than sentence-initial [p] or [t̪]. This phenomenon of [k] being slightly less aspirated than [p] and [t̪] was observed even in words uttered in isolation.

(d) Word-initial [p], [t̪] and [k] in the middle of a sentence are less aspirated than sentence-initial [p], [t̪] and [k] and word-initial [p], [t̪] and [k] in words said in isolation.

(e) All voiceless stops in word-medial position are unaspirated in connected speech as they are in words said in isolation.

(f) Intervocalic long voiceless stops are all unaspirated in connected speech as well. In a couple of samples examined we did come across a period of voicelessness of between 10 and 20 m.secs. This is perhaps due to the fact that the words in which these stops occur are said with emphasis, the context requiring emphasis.

6.3.4 Conclusions - Summary:-

(1) Word-initial voiceless stops are slightly aspirated.

(2) Word-medial voiceless stops are unaspirated.

(3) Intervocalic long voiceless stops are unaspirated.

(4) In connected speech, sentence-initial voiceless stops and word-initial voiceless stops in the middle of a sentence are slightly aspirated. Medial voiceless stops and intervocalic long voiceless stops are unaspirated.

6.3.5 Though we can come to the above conclusions on the basis of the elaborate kymographic study attempted, in order to be able to give a definite pronouncement on the aspiration or lack of it of the voiceless stops of Tamil (in the present writer's speech), kymograms were made of a few English, Hindi and Kannada words with the help of native speakers of these three languages. In Southern English voiceless stops in stressed syllables are aspirated, in Hindi aspirated and unaspirated voiceless stops occur in minimal pairs[19] and in Kannada aspirated and unaspirated stops occur, there being separate orthographic symbols to represent them. It was thought, therefore, that a comparison between what we have chosen to call slightly aspirated voiceless stops of Tamil and the aspirated voiceless stops of English, Hindi and Kannada would be of interest. Very few examples were chosen from each of these languages. The period of voicelessness after the release phase of the stop is tabulated below. The English words are given in orthography

19. See Masica, Krishnaswamy and Chaturvedi (1963, 70).

and the Hindi and Kannada words are transliterated, using one I.P.A. symbol for one symbol of the Hindi and Kannada orthographies.

Table 19:-

English aspirated and unaspirated stops.

stop consonant	word used (the stop consonant in question is under-scored)	aspiration (m.secs.)			
		speaker I (said each word once)	speaker II (said each word thrice)		
			(1)	(2)	(3)
[p]	pin	45	60	45	55
	pad	85	75	60	65
	paper	80	70	50	50
	pepper	80	55	50	50
	pat	90	80	70	60
	pineapple	85	70	55	50
	appear	85	50	30	35
[t]	take	45	70	70	65
	tap	70	60	70	70
	tub	70	80	60	70
	butter	35	20	30	30
	barter	35	20	20	20
	attempt	75	65	50	55
[k]	cake	85	60	55	50
	keep	80	65	65	60
	cup	75	65	55	70
	cool	80	60	65	50
	thinking	20	25	25	25
	cucumber	75	80	70	70
	cucumber	35	35	25	25

Table 20:-

Hindi aspirated and unaspirated stops

aspirated stops				unaspirated stops			
stop consonant	word used	aspiration (m.secs.) each word was said twice		stop consonant	word used	aspiration (m.secs.) each word was said twice	
		(1)	(2)			(1)	(2)
[p^h]	p^hal (fruit)	110	85	[p]	pal (moment)	05	05
	p^haṭa: (rags)	75	65		paṭa: (belt)	10	05
[t^h]	t^han (nipple)	120	100	[t]	tan (body)	5	10
	t^hakna (feeling tired)	75	70		takna	0	5
[$ṭ^h$]	$ṭ^h$i:k (all right)	80	75	[ṭ]	ṭi:k (caste mark)	0	0
	$ṭ^h$e:ka:na:	55	65		ṭe:ka:na:	5	5
[k^h]	k^ha:l	105	95	[k]	ka:l (time)	10	15
	k^haṭa: (sour)	75	65		kaṭa: (cut)	0	5

Table 21:-

Kannada - aspirated and unaspirated stops.

aspirated stops			unaspirated stops		
stop consonant	word used	aspiration (m.secs)	stop consonant	word used	aspiration (m.secs)
[p^h]	p^hala (fruit, result)	70	[p]	pu:ɖʒe (worship)	20
	p^hakkane (suddenly)	55		paṭa (paper-kite)	10
	vip^{h}alaṭe (failure)	80		paṭra (letter)	10
	sap^{h}alaṭe (success)	75		pa:da (foot)	10
				pa:naka (a sweet drink)	10
				paṭṭe (silk)	10
				palja (vegetable)	10
				paṭa:ki (fire-works)	15
[$t̪^h$]	$t̪^h$aṇḍi (cold)	50	[t̪]	t̪ale (head)	10
	t̪it̪^{h}i (death anniversary)	80		t̪amma (younger brother)	10
	paḍa:rt̪^{h}a (articles, things)	55		t̪aŋgi (younger sister)	10
	art̪^{h}a (meaning)	50		t̪aṇḍe (father)	5
	at̪^{h}ava (or)	50		t̪a:ji (mother)	5
	prat̪^{h}ama (first)	50		t̪aŋga:li (breeze)	5

Table 21:-

Kannada - aspirated and unaspirated stops. (contd).

aspirated stops			unaspirated stops		
stop consonant	word used	aspiration (m.secs.)	stop consonant	word used	aspiration (m.secs.)
[ʈʰ]	ʂʈʰa:na (place)	55	[ʈ]	ʈikku (to rub)	5
	swa:rʈʰa (selfishness)	65		ʈuppa (clarified butter)	10
	ana:ʈʰa (orphan)	85		ʈumba (fully)	5
	ʂʈʰiʈi (condition)	50		ʈoɖe (thigh)	5
				ʈiʈʰi (death anniversary)	5
				ʂʈʰiʈi (condition)	10
[ʈʰ]	kaɳʈʰa (neck)	55	[ʈ]	ʈagaru (wild goat)	5
	paʈʰa (picture)	45		ʈamaru (a musical instrument)	5
	maʈʰa (monastery)	60		kuɳʈi (lame woman)	10
	la:ʈʰi (baton)	95		ʈe:pu (ribbon)	5
	pa:ʈʰa (lesson)	80		i:ʈi (spear)	10
	ʈʰanaʈʰana (tinkling)	50		puʈa (page-of a book)	10
	ʈʰa:ne (station)	70		iʂʈa (liking)	10
	ʂuɳʈʰi (ginger)	55		kaʂʈa (difficulty)	5
	kaʈʰina (difficult)	40		u:ʈa (food)	10

Table 21:-

Kannada - aspirated and unaspirated stops. (contd).

aspirated stops			unaspirated stops		
stop consonant	word used	aspiration (m.secs.)	stop consonant	word used	aspiration (m.secs.)
[k^h]	k^haɖga (sword)	55	[k]	ku:gu (cry-imp)	25
	k^haɳidʒa (minerals)	60		kemmu (cough-n.)	30
	k^haɳadʒa (store-room)	75		ka:lu (leg)	20
	ʂik^{h}ara (peak)	70		kappu (black)	15
	ʂaŋk^{h}a (sea-shell)	100		ka:ʃaga (battle)	20
	muk^{h}a (face)	75		kappe (frog)	20
	suk^{h}a (well-being)	70		ko:lu (stick)	25
	k^{h}atʃiʈa (definite)	70		koɖe (umbrella)	15
	muk^{h}aɳɖa (leader)	60		kaɳt^{h}a (neck)	10
				kaʈhe (story)	15
				kuɳʈi (lame woman)	20
				kaʂʈa (difficulty)	20

6.3.7 In the English examples tested, in the speech of one speaker, [p] in stressed syllables has an average aspiration of 78 m.secs., [t] 65 m.secs. and [k] 79 m.secs. In unstressed syllables [t] has an average aspiration of 35 m.secs. and [k] 28 m.secs.

6.3.8 In the speech of the other speaker [p], [t] and [k] in stressed syllables have an average aspiration of 58 m.secs., 65 m.secs. and 63 m.secs. respectively, while in unstressed syllables [t] and [k] have an average aspiration of 23 m.secs. and 27 m.secs. respectively.

6.3.9 The Hindi examples tested are too few to say anything conclusive, but all the samples tested are minimal pairs and whereas [p], [t̪], [ʈ] and [k] are very slightly aspirated, their aspirated counterparts are, understandably, very heavily aspirated.

6.3.10 In the Kannada samples tested, [p], [t̪], [ʈ] and [k] have an average aspiration of 12 m.secs., 7 m.secs., 8 m.secs. and 20 m.secs. respectively. [p^h], [$t̪^h$], [$ʈ^h$] and [k^h], on the other hand, are very heavily aspirated, the average period of voicelessness being 70 m.secs., 59 m.secs., 61 m.secs. and 71 m.secs. respectively.

6.3.11 When compared with the aspirated voiceless stops of English, Hindi and Kannada, the voiceless stops of Tamil have negligible aspiration. In fact some of the unaspirated voiceless stops of these languages have

as long a period of voicelessness after the release phase of the stop as the voiceless stops in Tamil tested in our analysis. Are we then justified in calling the word-initial voiceless stops of Tamil even slightly aspirated ? One feels that one is justified because:-

(a) In Tamil there are no heavily aspirated voiceless stops to be contrasted with what we have called slightly aspirated voiceless stops.

(b) Intervocalic long voiceless stops are even less aspirated (if aspirated at all) than word-initial ones (except word-initial [t̪] which is unaspirated).

6.3.12 In order to make the distinction between the slightly aspirated word-initial voiceless stops (except [t̪]) and the less aspirated or unaspirated medial and intervocalic voiceless stops, the present writer has chosen to call the former slightly aspirated and the latter two unaspirated. Throughout this thesis, slight aspiration has been marked with the symbol [ʻ] thus: [pʻ], [t̪ʻ], [kʻ]. Those voiceless stops that are considered unaspirated have been left unmarked.

Chapter VII

The Consonants of Tamil -
A Palatographic & kymographic study.

(pages 304 - 435)

Chapter VII

7 THE CONSONANTS OF TAMIL.

7.1 General Remarks:-

7.1.1 The consonants that occur in the dialect of Tamil under survey are discussed in the following pages. Two aspects of the voiceless stop consonants - aspiration and the status of the so-called "double" or "geminated" voiceless stops - have been discussed elaborately in two earlier chapters (see Chapter VI and Chapter V respectively). When these aspects are referred to in the course of the present discussion of consonants, relevant cross-references are given. Extensive palatographic study was made during the course of this research to study the articulation of consonants. Some of the palatograms are reproduced in this chapter in appropriate places.

7.1.2 This chapter is a phonetic description of the consonants of Tamil. Nothing is said about phonemes or about the phoneme to which a particular consonant belongs. A brief phonemic analysis of the dialect of Tamil under survey is given in a later chapter. (see chapter VIII). The phonemic statements made in that chapter are based on the phonetic observations made in this chapter and in other relevant chapters of this thesis.

7.1.3 The various varieties of a consonant - the various allophones of a consonant phoneme - are discussed in this chapter. While discussing aspiration of voiceless stops, duration of stop consonants, etc., the reader is referred to the relevant kymographic evidence cited in the two earlier chapters.

7.1.4 As a preliminary to the description of the consonants in detail, it seems useful to say a little about the phonation types [1] involved in the articulation of Tamil consonants, the air-stream mechanisms employed and the lip position during the articulation of the consonants.

7.2 Phonation types:-

7.2.1 Only two types of phonation are used during the articulation of Tamil consonants - breath and voice. All consonants in Tamil are either breathed or voiced - there are no murmured sounds, whispered sounds, creaky sounds etc., in normal speech. During the articulation of voiceless sounds - [p], [k], [ɕ], [ʂ] etc., - the glottis is wide open. During the articulation of voiced sounds - [b], [m], [dʒ], [l], [ɻ] etc., - there is periodic vibration of the vocal cords. Appropriate kymograms indicating the vibration of the vocal cords or the lack of it are included where necessary.

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1. The term "phonation" is used here in the sense in which it has been used by Catford (1961, 26).

7.2.2 All the consonants in Tamil are the result of pulmonic egressive air-stream mechanism.[2] There are no implosives, ejectives, etc., in Tamil and hence the other air-stream mechanisms are not involved in Tamil speech.

7.3 Lip position:-

7.3.1 The position of the lips during the articulation of any Tamil consonant is conditioned by the vowel that immediately follows the consonant. If the vowel that immediately follows the consonant is a spread vowel, the lips are spread during the articulation of the consonant; if the following vowel is a rounded one, the lips are rounded during the articulation of the consonant.

7.3.2 To check this phenomenon, a number of labiograms were taken. These labiograms confirmed that the lip-position during the articulation of a consonant is dependant upon the vowel that follows the consonant. A few of these labiograms are reproduced on the next few pages.

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2. See Abercrombie (1967, 23-33), Ladefoged (1967), Catford (1939) and Ladefoged (1968, 5-6).

Lgm. 15
Closure for [p] in
[ɬʼʌpːɪ] (having escaped)

Lgm. 16
Closure for [p] in
[ɬʼʌpːɪ] (fault)

Lgm. 17
Closure for [p] in
[ɔpːɔ] (salt)

Lgm. 18
Closure for [ɬ] in
[aɬːɔ] (aunt)

Lgm. 19
Closure for [ɬ] in
[kʼaɬːɪ](knife)

Lgm. 20
Closure for [ɬ] in
[pʰaɬːə](in order to
light)

Lgm. 21
Closure for [ɬ] in
[pʰaːɬʷaː] (she saw)

Lgm. 22
Closure for [ɬ] in
[pʰaɬːɛ] (ten)

Lgm. 23
Closure for [ɬ] in
[pʰaɬːɔ] (anthill)

Lgm. 24
Closure for [ʈ] in
[pʻɑ:ʈ·ɪ] (grandmother)

Lgm. 25
Closure for [ʈ] in
[pʻɑʈ:i̇] (silk)

Lgm. 26
Closure for [ʈ] in
[ʈʻo:ʈ·ʌ] (garden)

Lgm. 27
Closure for [ʈ] in
[pʻu:ʈ·ɷ] (lock-n.)

Lgm. 28
Closure for [k] in
[bɑ:k·ɪ] (remainder)

Lgm. 29
Closure for [k] in
[pʻɑ:k·i̇] (arecanut)

Lgm. 30
Closure for [k] in
[ʈʻu:k·ɷ] (lift-imp.)

Lgm. 31
Closure for [m] in
[ɑm:ɪ] (grinding-
stone)

Lgm. 32
Closure for [m] in
[ɕɷm:ɑ:] (simply)

Lgm. 33
Closure for [m] in
[tʻɷ m:ɑ] (sneeze-imp.)

Lgm. 34
Closure for [n] in
[p'ɑn:ɪ] (pig)

Lgm. 35
Closure for [n] in
[k'ɑn:i] (calf)

Lgm. 36
Closure for [n] in
[p'on:ɷ] (gold)

Lgm. 37
Closure for [ŋ] in
[p'ɑŋ:ɪ] (having done)

Lgm. 38
Closure for [ŋ] in
[k'ɑŋ:i] (eye)

Lgm. 39
Closure for [ŋ] in
[p'ɷŋ:ɷ] (wound-n.)

Lgm. 40
articulation of [l] in
[p'ɑ l:ɪ] (lizard)

Lgm. 41
articulation of [l] in
[p'ɑl:i] (tooth)

Lgm. 42
articulation of [l]
in [p'ɷl:ɷ] (grass)

Lgm. 43
articulation of [ɭ] in
[p'ɷɭ:ɪ] (dot)

Lgm. 44
articulation of [ɭ] in
[mɷɭ:ɷ] (thorn)

Lgm. 45
articulation of [ɻ]
in [p'aɻɪ] (hunger)

Lgm. 46
articulation of [ɻ]
in [k'oɻɷ] (mosquito)

Lgm. 47
articulation of ʐ
in [p'a ʐɪ] (guilt)

Lgm. 48
articulation of [ʐ]
in [p'ɷʐɷ] (worm)

THE CONSONANTS IN DETAIL

7.4 STOP CONSONANTS

7.4.1 [p] Voiceless bilabial stop:-

7.4.1.1 The voiceless bilabial stop [p] is articulated in the following manner. The two lips are closed completely, thus blocking the oral passage of air. The soft palate is raised, thereby blocking the nasal passage of air as well. When the lips are separated, the air that is compressed by pressure from the lungs escapes with an explosive sound. The vocal cords do not vibrate.

7.4.1.2 During the articulation of [p] the tongue is free to assume any position and it assumes the position of the vowel immediately following it while pronouncing words. In pronouncing [p'i:] (excreta), for example, when the lip closure is maintained, the 'front' of the tongue is raised in the direction of the hard palate, ready for the articulation of the front vowel [i:] that follows the [p]. In pronouncing [p'u:] (flower), on the other hand, when the lip closure is maintained, the 'back' of the tongue is raised in the direction of the soft palate, in readiness for the articulation of the back vowel [u:] that follows the [p].

7.4.1.3 During the closure for [p] the lips are spread if the following vowel is a spread vowel and the lips are rounded if the following vowel is a rounded one. See Lgms 15, 16 and 17.

7.4.1.4 In the dialect of Tamil under survey, there are several varieties of [p] and these are discussed briefly below:-

7.4.1.5 (a) [pʻ] Voiceless bilabial stop with slight aspiration.[3]

[pʻ] occurs only in word-initial position followed by a vowel as in

[pʻaɽɪ] (measure)

[pʻanɪ] (dew)

(see kymograms 97 and 98 in chapter VI)

7.4.1.6 (b) [p] unaspirated voiceless bilabial stop

[p] occurs in word-initial consonant clusters as in [pɾa:ɳɪ] (living being), [pɾaja:ɳÃ] (travel-n.) and in word-medial consonant groups as in [apɭã:] (pappadams) and [apɾÃ] (later on). (see kymogram 102 in chapter VI).

7.4.1.7 (c) [pᴺ] Voiceless bilabial stop with nasal plosion.

[pᴺ] occurs when [p] is immediately followed by the bilabial nasal consonant [m]. To the present writer's knowledge, nasally exploded [p] occurs in only one word in his dialect - [ɒpma:] (a savoury made with semolina). (see kymogram 99 in chapter VI).

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3. For a detailed discussion of aspiration of [p] see chapter VI.

7.4.1.8 (d) [p•] partially long, tense unaspirated voiceless bilabial stop

In articulating [p•] the lip closure is maintained for a longer time than in articulating [p]. [p•] occurs only intervocalically. It occurs in disyllabic words if the vowel immediately preceding it is long, as in [k'a:p•ɨ] (a kind of bangle). It also occurs in words having more than two syllables, irrespective of the length of the vowel preceding it, as in [k'ɑrɨp•ɨ] (black), [pɑrɨp•ɨ] (lentils). (see kymograms 70, 71 and 72 in chapter V).

7.4.1.9 (e) [p:] long, tense, unaspirated voiceless bilabial[4] stop

In articulating [p:] the lip closure is maintained for a longer duration than in articulating [p•] described above. [p:] occurs only intervocalically, and that too, only in disyllabic words when the vowel immediately preceding it is short as in [ɔp:ɔ] (salt), [ap:a:] (father). (see kymogram 69 in chapter V and compare the duration of [p:] in that with the duration of [p•] in kymogram 70).

7.4.1.10 In connected speech of say, two words, if the first ends in a vowel and the second begins with a [p'], the word-initial [p'] of the second word is

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4. For a detailed kymographic analysis of the duration of intervocalic voiceless stops, see chapter V and Appendices IIIa and IIIb.

replaced by [p•] if there is no pause between the two words or if the context permits the two lexical words to be realized as one phonological word. If there is a pause between the two words or if the context does not permit the realization of the two lexical items as one phonological word, the initial [p'] of the second word is retained in pronunciation. For example, [rombə] (very) and [p'ɛɾɪɸi] (big) in connected speech is [rombəp•ɛɾɪɸi] (very big). But [ɑʋÃ] (he), [rombə] (very) [p'ɛɾɪjə] (big) and [p'ɑijÃ] (boy) are [ɑʋÃ rombə p'ɛɾɪjəβɑijÃ] (he is a very big boy) in connected speech, with the initial [p'] of the third word retained in pronunciation. But we see the initial [p'] of the fourth word [p'ɑijÃ] (boy) replaced by [β] in connected speech. In fact there is an orthographic consideration here. As discussed earlier (see chapter V, 5.13 to 5.20), in writing down connected speech, the orthography sometimes doubles the word-initial voiceless stop symbol if the immediately preceded by a vowel and sometimes there is no such doubling. For example, ṟomba (very)and peṟija (big) are written down ṟombappeṟija with the initial p of the second word doubled. But in writing down peṟija (big) and peṭṭi (box), the orthography does not double the p of the second word. The two words, in connected speech, are written down peṟija peṭṭi. The first expression (very big) is [rombəp•ɛɾɪjə] or

[rombə p'ɛrɪjə] depending upon a pause between the two words or the context permitting or not permitting the two lexical items as a single phonological word. But the second expression (big box) is [p'ɛrɪjə p'oʈ:ɪ] with a pause between them or [pɛrɪjəβoʈ:ɪ] without any such pause. Where the orthography doubles the initial p in writing down connected speech, the double pp is always [p'] or [p·] in pronunciation. Where the orthography does not double the initial p in writing down connected speech, the single p in the middle of a sentence may be [p'] or [β] in speech.

7.4.1.11 None of the varieties of [p] described above ever occurs in word-final position in Tamil. Even in pronouncing loan words with a final [p] in them, a vowel is added to the [p]. For example, the word soap is pronounced [so:p·ɷ] and the word soup is pronounced [su:p·ɷ] in Tamil.

7.4.2 [b] Voiced bilabial stop:-

7.4.2.1 [b] is articulated exactly as [p] described in 7.4.1.1 above, except that during the articulation of [b] the vocal cords vibrate, producing voice.

Distribution:-

7.4.2.2 (a) [b] occurs initially as in

[baɲjÃ] (fear)

[baɭÃ] (strength)

The present writer, in an earlier analysis[5] of his speech, depending purely upon his proprioception, stated that [b] in word-initial position is slightly devoiced and could be notated [b̥]. But on an elaborate kymographic analysis, he found that all voiced consonants are fully voiced in word-initial position and word-final position. Word-initial [b] being fully voiced is illustrated with a kymogram. (see kymogram 121).

7.4.2.3 (b) [b] occurs immediately after nasals as in

[t̪ʻambɪ] (younger brother)

[anbɨ] (love)

[pʻaɳbɨ] (culture) (see kymogram 123)

7.4.2.4 (c) [b:] - a voiced bilabial stop with the duration of lip-closure prolonged occurs inter-vocalically in a few words like [ɖab:a:] (a tin, a can), [ab:a:] (an exclamation indicating weariness etc.). (see kymogram 123).

7.4.2.5 (d) [b] does not occur finally in a word in Tamil. There are a number of loan words with a final [b], but these words are pronounced with a final epenthetic vowel. For example, the word bulb is pronounced [balbɨ].[6]

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5. Balasubramanian (1970). The same statement was made with regard to initial [d̪], [g], [ɖʒ] and initial and final nasals and laterals.

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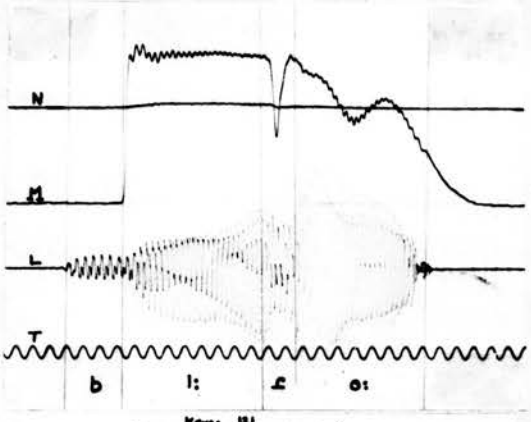
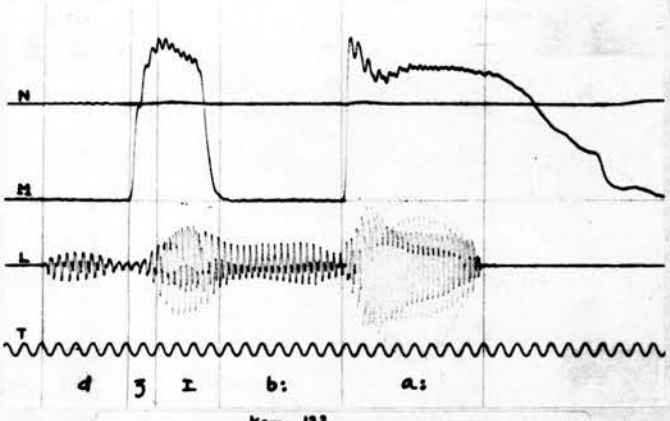
6. In fact in the dialect of Tamil under survey, no stop consonant, voiceless or voiced, ever occurs in word-final position. But there are a number of loan words that occur very freely in people's spontaneous speech and many of these have a word-final stop in the source language. In pronouncing these words, a Tamilian invariably adds a vowel to the final stop of the loan word. A few examples are:-

loan word	Tamil pronunciation
soap	[so:p•o]
bulb	[balbɨ]
coat	[ko:ʈ•o]
silk	[sɪlkɨ]
egg	[jɛg:ɨ]
court	[kʻo:ɾʈ•o]

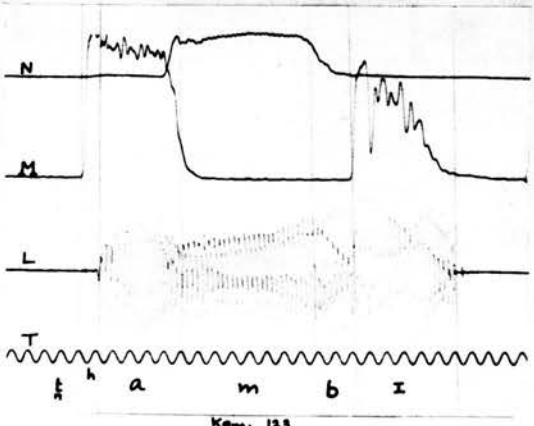
VOICED BILABIAL STOP.



Kgm. 121
[bi:f oi] (wardrobe)
Word-initial [b]



Kgm. 122
[dʒɪb:a:] (a male upper garment)
Long intervocalic [b:]



Kgm. 123
[tʰambɪ] (younger brother)
[b] after the nasal [m]

N-Nose out M-Mouth out L-Larynx
T-Time (50 cps)

7.4.3 [t̪] Voiceless dental stop:-

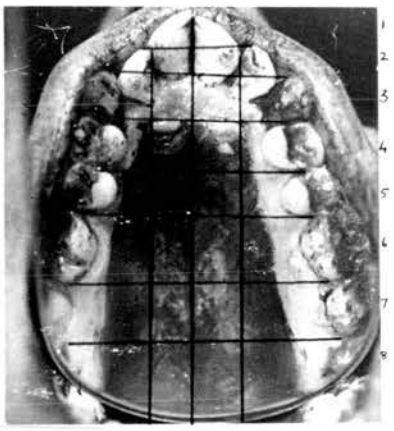
7.4.3.1 In articulating [t̪] the blade of the tongue makes a firm contact with the upper front teeth in such a way that the oral passage of air is blocked completely. The soft palate is raised and thus the nasal passage of air is blocked, too. The air that is compressed by pressure from the lungs escapes with an explosive sound when the blade of the tongue is removed from the upper front teeth. The vocal cords do not vibrate.

7.4.3.2 The articulation of [t̪] was investigated with the help of word-palatograms. Palatograms were made of words with the stop immediately followed by [ɛ], [ɔ] and [i] to investigate if the vowel following the stop has any influence on the consonant articulation. Three of the palatograms are reproduced on the next two pages. A set of them are divided into zones in the manner suggested by Firth (1948). Another set of the same palatograms are life-size ones with a sectional diagram of the roof of the mouth (drawn from a sawed plaster cast) drawn above each palatogram.

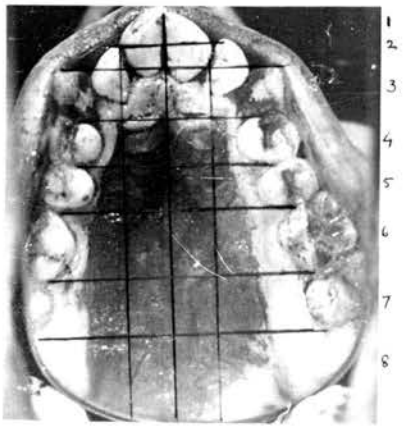
7.4.3.3 Palatogram 17 is of the word [ɑt̪:ɛ] (aunt). In this palatogram we see a very clear wipe-off in the dental and denti-alveolar zones and a wipe-off on the right side of the alveolar zone. In palatogram 18 of the word [p'ot̪:ɔ] (cover-imp.) and palatogram

Articulation of [ʈ]

Pgm. 17
[ɑʈ:ɛ] (aunt)



Pgm. 18
[pʰoʈ:ɔ] (cover-imp.)

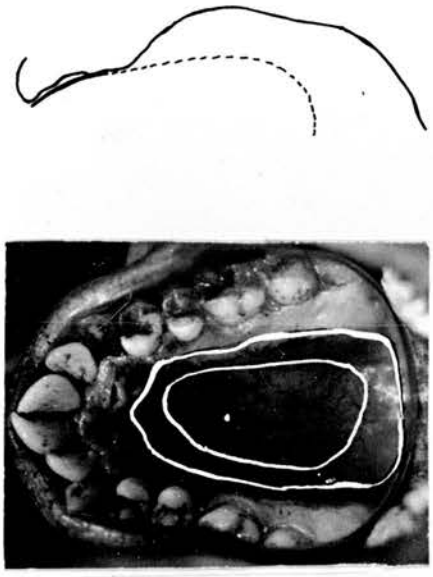


Pgm. 19
[pʻɑ ʈ:ɨ] (ten)

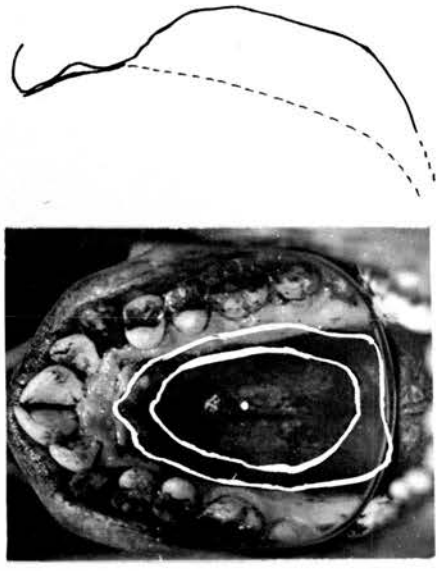
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

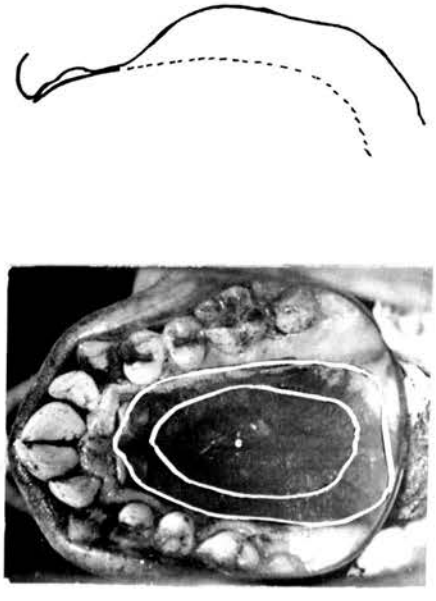
Articulation of [ʈ̪]



Pgm. 20
[aʈ̪:ɛ] (aunt)



Pgm. 21
[pʿoʈ̪:ɷ] (cover-imp.)



Pgm. 22
[pʿaʈ̪:i] (ten)

19 of the word [p'ɑt̪:i] (ten), we see a clear wipe-off in the dental, denti-alveolar and alveolar zones. In palatogram 18 of the word [p'ot̪:o] there is a suggestion of a wipe-off on the right side of the post-alveolar zone as well. This extended wipe-off is perhaps because of the tongue being further backward in the mouth in readiness for the articulation of the back vowel [o] that follows the dental stop.

7.4.3.4 Palatograms 20, 21 and 22 are of the same three words [ɑt̪:ɛ], [p'ot̪:o] and [p'ɑt̪:i] respectively, reduced to life-size. Each palatogram is accompanied by a sectional diagram of the roof of the mouth. The main wipe-off caused by the blade of the tongue during the articulation of [t̪] is marked on the sectional diagram. Then the position assumed by the centre of the tongue during the consonant-closure is marked on the sectional diagram in dashed lines. This is done under the assumption that during the articulation of a consonant the main body of the tongue will assume the position needed for the articulation of the vowel immediately following it. These tongue-positions are drawn from X-ray photographs. The X-ray photographs form the frontispiece of this thesis. Tracings of the X-rays are reproduced in chapter III.

Distribution of the voiceless dental stop:-

7.4.3.5 (a) [t̪ʻ] slightly aspirated voiceless dental stop:-

[t̪ʻ] occurs only in word-initial position and it is always followed by a vowel, as in

[t̪ʻɑp:ɨ] (fault)

[t̪ʻoṭ:ɪ] (tub) (see kymograms 103 and 104 in chapter VI)

7.4.3.6 (b) [t̪] unaspirated voiceless dental stop:-

[t̪] occurs in word-initial consonant clusters as in [t̪ɾɑ:ɳɪ] (strength) and in word-medial consonant groups as in [pʻɑ:t̪ɾÃ] (vessel). (see kymograms 105 and 106 in chapter VI).

7.4.3.7 (c) [t̪•]-slightly long, unaspirated voiceless dental stop.

[t̪•] occurs only intervocalically in disyllabic words when the vowel immediately preceding it is long and in words of more than two syllables irrespective of the length of the preceding vowel. For example:

[kʻɑ:t̪•ɨ] (wind)

[kʻɑt̪•ɑ:ʐɛ] (cactus) (see kymograms 76-78 in chapter V).

7.4.3.8 (d) [t̪:]-long,tense, unaspirated voiceless dental stop

[t̪:] occurs only intervocalically, and that too only in disyllabic words when the vowel

immediately preceding it is short as in [pʻaṯːɨ] (ten), [aṯːɛ] (aunt). (see kymogram 75 in chapter V).

(e) Neither [ṯʻ] nor [ṯ] occurs finally in a word.

7.4.3.10 In connected speech of say, two words, if the first word ends in a vowel and the second begins with [ṯʻ], the [ṯʻ] of the second word is replaced by [ṯ•] in speech if there is no pause between the two words or if the context permits the two lexical items to be realized as one phonological word. This is done only if the orthography doubles the initial ṯ of the second word in writing down a bit of connected prose. To cite an example, avaɭai and ṯeːʈu are [avəɭɛṯ•əːʈɨ] in connected speech and the orthography doubles the ṯ of the second word. But the words maːmaː and ṯanʈaːɾ (uncle gave) are [maːmaː ṯʻandaːɾ] or [maːmaːðandaːɾ] in speech, depending respectively upon whether or not there is a pause between the two words. The orthography, in this case, does not double the ṯ of the second word in writing down connected speech.

7.4.4 [d̪] Voiced dental stop.

7.4.4.1 [d̪] is articulated in exactly the same way as [ṯ] described in 7.4.3.1 above, except that in articulating [d̪] the vocal cords vibrate, producing voice.

Distribution

7.4.4.2 (a) [d̪] occurs initially as in

[d̪a:nÃ] (charity)

[d̪ɛnÃ] (daily)

This initial [d̪] is fully voiced. (see kymogram 124).

7.4.4.3 (b) [d̪] occurs in initial clusters in a few words like

[d̪ja:nÃ] (meditation)

[d̪ra:kʂɛ] (grapes)

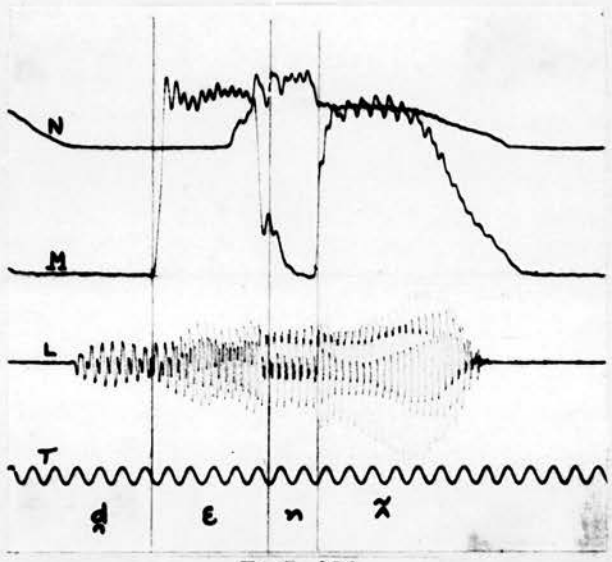
7.4.4.4 (c) [d̪] occurs in the medial consonant group [nd̪] as in

[p'and̪i] (ball)

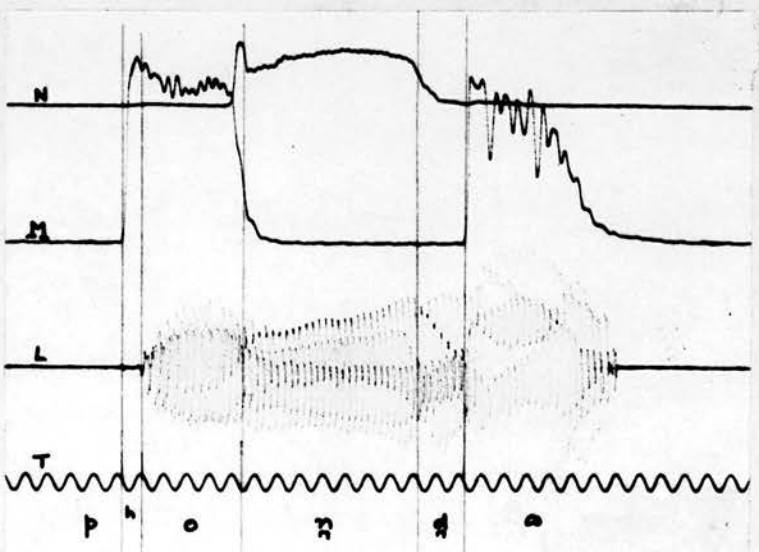
[p'ond̪o] (hole)

7.4.4.5 (d) [d̪] does not occur finally in a word.

VOICED DENTAL STOP



Kgm. 124
[d̪ɛnx] (daily)



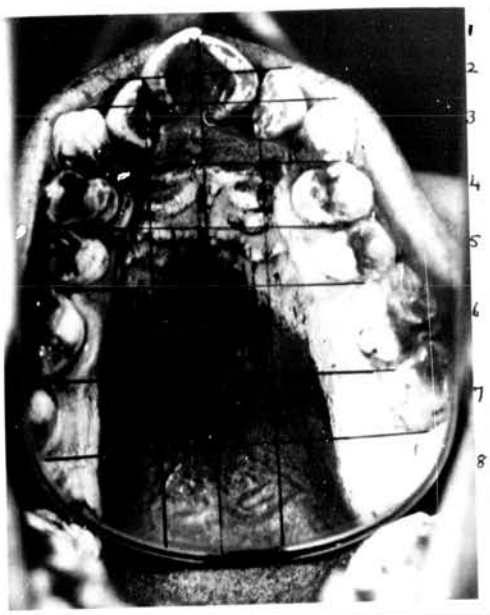
Kgm. 125
[pʰoŋ̪d̪a] (hole)

7.4.5 [t] Voiceless post-alveolar stop:-

7.4.5.1 [t] is articulated by bringing the tip of the tongue in close contact with the post-alveolar region, thereby shutting off the oral passage of air completely. The soft-palate is raised, thereby shutting off the nasal passage of air as well. The air that is compressed by pressure from the lungs escapes with an explosive sound when the tip of the tongue is removed from the post-alveolar region. The vocal cords do not vibrate during the articulation of [t].

7.4.5.2 Two palatograms of the word [wotɛɛ] (cobweb) are reproduced on the next page. One is divided into zones (Palatogram 23) and that palatogram reveals that during the articulation of [t] the tip of the tongue does not touch the dental, the denti-alveolar and the alveolar zones. There is a clear wipe-off in zone 4 - the post-alveolar zone - which extends to the sides of the pre-palatal zone. The centre of the pre-palatal zone is still coated with the marking medium. So we can say that during articulation of [t] the tip of the tongue makes contact with the post-alveolar region. The sides of the tongue have removed some marking medium from the sides of the pre-palatal zone. Palatogram 24 is of the same word. This palatogram is reduced to life-size and it is accompanied by a sectional diagram of the roof of the mouth. The main wipe-off

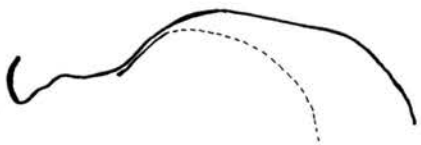
Articulation of [t̪]

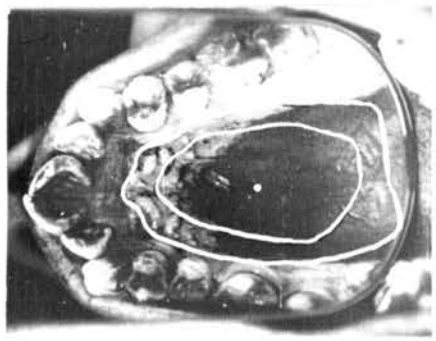


The Zones:

1. dental 2. denti-alveolar
3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal
7. post-palatal 8. Velar

Pgm. 23
[wot̪ɛɛ] (cobweb)





Pgm. 24
[wot̪ɛɛ](cobweb)

caused by the tip of the tongue during the articulation of [t̪ɾ] is marked on the sectional diagram. Also marked in dashed lines is the position assumed by the main body of the tongue during the closure for [t̪].

Distribution of [t̪]:-

7.4.5.3 In the dialect of Tamil under survey, [t̪] occurs only in the consonant group [t̪ɾ] as in

[wot̪ɾɛ] (cobweb)

[a:t̪ɾa:] (she shakes - something).

7.4.5.4 A number of loan words from English with an initial [t] are used by Tamil speakers, but they use [ʈ] instead of [t] or [t̪]. Thus tea is pronounced [ʈi:] and table is pronounced [ʈe:bɭ].

7.4.6 [d̪] Voiced post-alveolar stop:-

7.4.6.1 [d̪] is articulated exactly like [t̪] described above, except that during the articulation of [d̪] the vocal cords vibrate, producing voice.

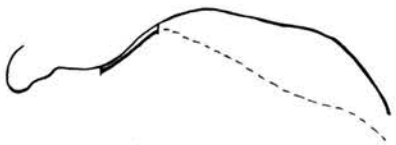
7.4.6.2 Two palatograms of the word [a:d̪ɾa:] (she is dancing) are reproduced on the next page (Palatograms 25 and 26). In palatogram 25 which is divided into zones we see that there is a clear wipe-off in zone 4 - the post-alveolar zone. The sides of the tongue seem to have removed some marking medium from the sides of the pre-palatal zone as well. Palatogram 26 is of the same word.

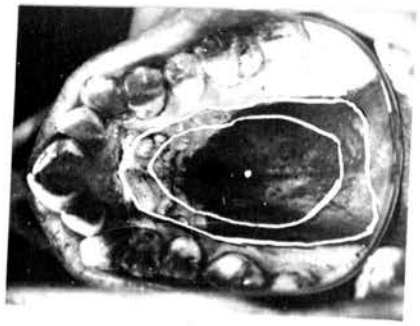
Articulation of [d]

The Zones:

1. dental
2. denti-alveolar
3. alveolar
4. post-alveolar
5. pre-palatal
6. palatal
7. post-palatal
8. velar

Pgm. 25
[a:d ɾa:] (she is dancing)





Pgm. 26
[a:d ɾa:] (she is dancing)

This palatogram is reduced to life-size and is accompanied by a sectional diagram of the roof of the mouth. The main wipe-off has been marked on the sectional diagram. Also marked in dashed lines is the position assumed by the main body of the tongue during the closure for [d̠].

7.4.6.3 Distribution of [d̠]:- [d̠] occurs only in the cluster [d̠ɾ] as in

[d̠ɾa:ma:] (drama)

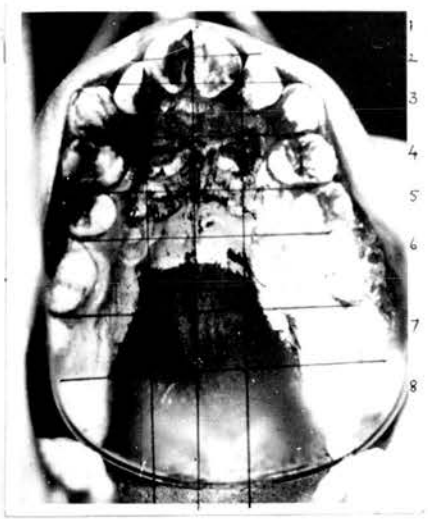
[wo:d̠ɾɛ̃] (I'm running)

7.4.7 [ʈ] Voiceless retroflex stop:-

7.4.7.1 In articulating [ʈ] the tip of the tongue is well curled back and the curled back tip is made to touch the hard palate in such a way as to shut off the oral passage of air completely. The nasal passage of air is blocked by raising the soft palate. The air that is compressed by pressure from the lungs escapes with an explosive sound when the tip of the tongue is removed from the hard palate. The vocal cords do not vibrate during the articulation of [ʈ].

7.4.7.2 Two sets of three palatograms are reproduced in the next few pages. One set has been divided into zones and the other set (of the same three words) is accompanied by a sectional diagram of the roof of the mouth. Palatograms 27, 28 and 29 are of the words [ʈi:] (tea), [pʻu:ʈ•ɷ] (lock) and [ɨʈ:ɨ]

Articulation of [ʈ]



Pgm. 27
[ʈi:] (tea)

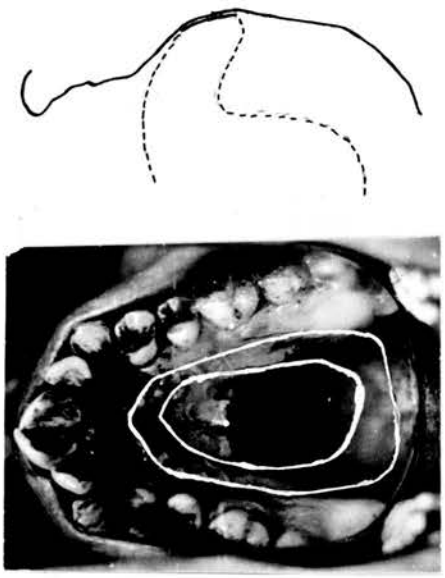
Pgm. 28
[pʻu:ʈ·ω] (lock-n.)

Pgm. 29
[ɨʈ:ɨ] (having placed)

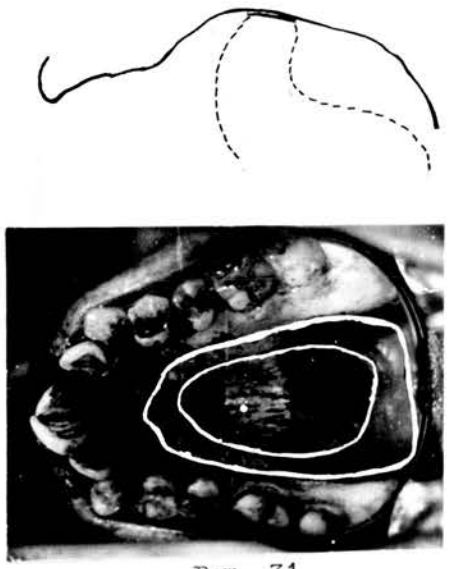
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

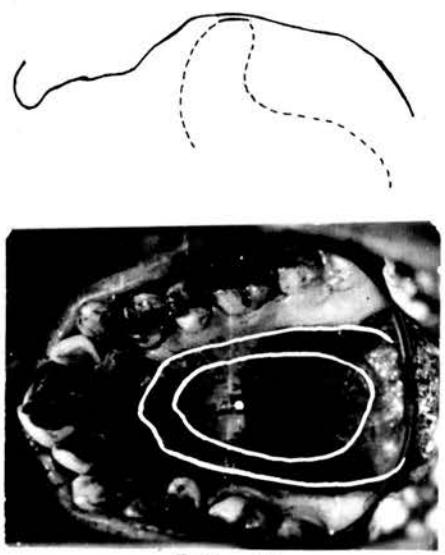
Articulation of [ʈ]



Pgm. 30
[ʈi:] (tea)
[ʈ] followed by a front vowel



Pgm. 31
[pʻu:ʈʻɔ] (lock-n.)
[ʈ] followed by a back vowel



Pgm. 32
[±ʈ:±] (having placed)
[ʈ] followed by a central vowel

X-ray photograph of the tongue-position of the voiceless retroflex stop [ʈ] with the front vowel [ɪ] following it. The picture was taken when the closure for the stop was maintained.

(having placed) respectively. In palatogram 27 we see a clear wipe-off in zone 5 - the pre-palatal zone - extending up to a part of zone 6 - the palatal zone. The tip of the tongue has thus touched the pre-palatal zone and part of the palatal zone during the closure for [ʈ] in pronouncing the word [ʈi:] (tea). In palatogram 28 of the word [pʻu:ʈʻo] we see a clear wipe-off in the entire palatal zone while the marking medium is left almost untouched in the pre-palatal zone. With a front vowel following the stop consonant, most of the palatal zone is left untouched by the tongue (as we saw in palatogram 27) but the marking medium from the whole of the pre-palatal zone has been removed. But in palatogram 28 we see the pre-palatal zone almost untouched but the marking medium from the entire palatal zone has been removed. It is clear thus that the articulation of [ʈ] is further backward in the mouth if a back vowel follows it and further forward in the mouth if a front vowel follows it. Palatogram 29 is of the word [ɨʈ:ɨ] (having placed) with the central vowel [ɨ] following the stop consonant. We find an interesting phenomenon here. The wipe-off is from about the middle of the pre-palatal region, extending up to the middle of the palatal region. The first half of the pre-palatal zone and the second half of the palatal zone are left untouched.

With a central vowel following the stop consonant, the closure for the articulation of the stop is neither too much forward (as it is when pronouncing the word [ʈi:]) nor too much backward in the mouth (as is the case when pronouncing [pʻu:ʈ•ɷ]). The tongue seems to assume a neutral position.

7.4.7.3 It can be seen from the palatograms of the word [ʈi:] and [ɨʈ:ɨ] (palatograms 27 and 29) that there is something of a wipe-off in zone 4 - the post-alveolar zone. This can be explained. The tongue does not touch the post-alveolar zone during the consonant closure. But once the tip of the tongue is released from the stop position, it does not come down smoothly. It flaps forward, particularly when a front vowel follows it. The tongue, while flapping forward after the stop is released, seems to have removed some marking medium from the post-alveolar zone.

Palatograms 30, 31 and 32 are of the same words as palatograms 27, 28 and 29 respectively. These are life-size ones. On the sectional diagram of the roof of the mouth that accompanies each of these palatograms the main wipe-off effected by the tongue during the consonant closure is marked. The position assumed by the main body of the tongue during the consonant closure is marked in each case with dashed lines.

7.4.7.4 The position assumed by the main body of the tongue during the closure phase of the retroflex stop was ascertained with the help of an X-ray photograph. The word [p'a:ʈ'ɪ] (grandmother) was said loudly several times by the writer. Then the word was said up to the [ʈ], the closure maintained and an X-ray taken. A photographic print of the X-ray is reproduced after the palatograms.

7.4.7.5 Distribution of [ʈ]:- There are various varieties of [ʈ] in the dialect of Tamil under survey. These are discussed below briefly and the distributional possibilities of each are analysed.

7.4.7.6 (a) [ʈ] unaspirated[7] short voiceless retroflex stop:-

[ʈ] does not occur initially in a word in native Tamil words. But [ʈ] is substituted by many Tamil speakers[8] when they pronounce loan words from other languages. A few of these words are:

[ʈi:]	(tea)
[ʈe:bl̩]	(table)
[ʈai]	(neck-tie)
[ʈɪn] ~ [ʈɪn:ɨ]	(tin, can)

7. [ʈ] is totally unaspirated in any position. See Table N in Appendix IVa and Tables 17 and 18 in chapter VI.

8. This observation applies to Tamil speakers in India. The present writer has heard Tamil speakers from Ceylon retaining the alveolarity of the [t] while pronouncing loan words.

[ʈ] also occurs in medial consonant groups as in [kʻu:pʈɨ] (having summoned) and [ɕa:pʈɨ] (having eaten) (see kymogram 111 in chapter VI).

7.4.7.7 (b) [ʈᴸ] Laterally exploded, short, unaspirated voiceless retroflex stop

[ʈᴸ] occurs in word-medial position when the [ʈ] is immediately followed by a retroflex lateral as in

[pʻoʈlÃ] (packet)

[pʻɪʈlɛ] (a type of curry)

7.4.7.8 (c) [ʈᴺ] Nasally exploded, short, unaspirated voiceless retroflex stop

[ʈᴺ] occurs in word-medial position when the [ʈ] is immediately followed by the retroflex nasal [ɳ] as in

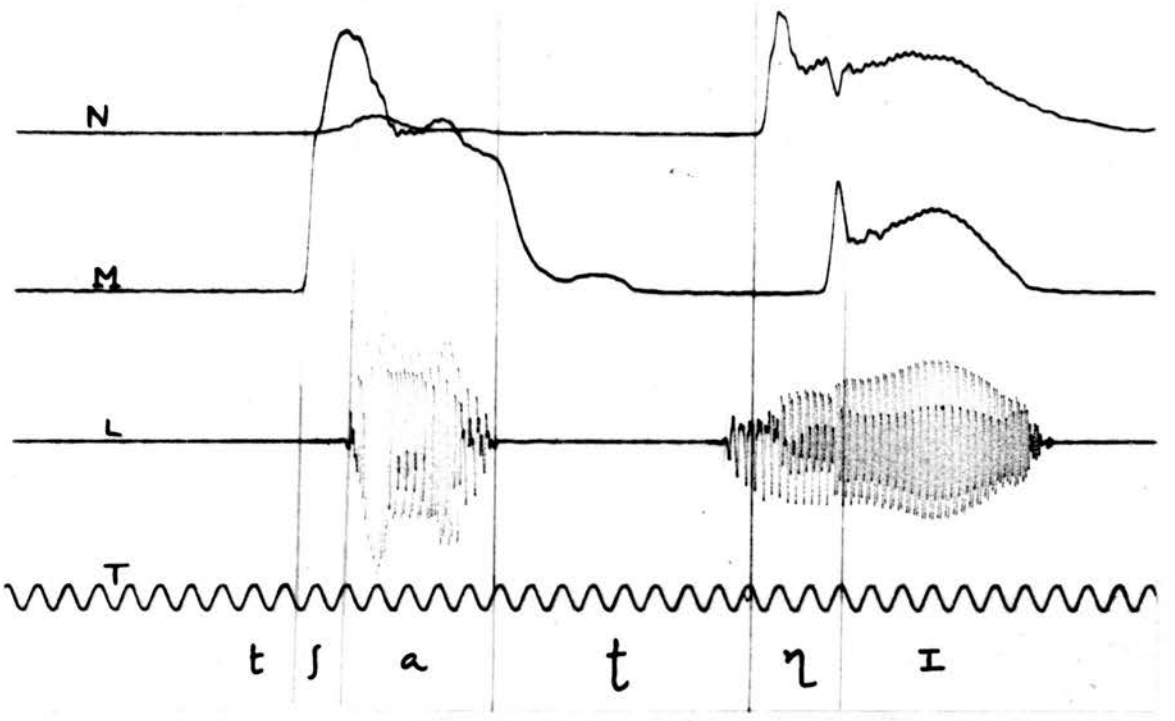
[pʻaʈɳɪ] (starvation)

[tʃaʈɳɪ] (chutney)

(see kymogram 126)

7.4.7.9 (d) [ʈ·] Slightly long, tense, unaspirated voiceless retroflex stop

[ʈ·] occurs only intervocalically. It occurs in disyllabic words if the preceding vowel is long. It also occurs in words of more than two syllables, irrespective of the length of the preceding vowel. A couple of examples are [kʻu:ʈ·Ã] (crowd), [kʻaʈ·a:jÃ] (certainly). (see kymograms 81 and 82 in chapter V).



Kgm. 126
[ʧatɳɪ] (chutney)
Nasally exploded [t]

N–Nose out M–Mouth out L–Larynx T–Time (50 cps)

7.4.7.10 (e) [ʈː] long, tense, unaspirated voiceless stop.

[ʈː] occurs only intervocalically and that too, only in disyllabic words. The vowel preceding it is always short as in [kʻoʈːɛ] (seed), [pʻɑʈːɨ] (silk). (see kymogram 80 in chapter V and compare the duration of the [ʈː] in that word with that in kymograms 81 and 82, also in chapter V).

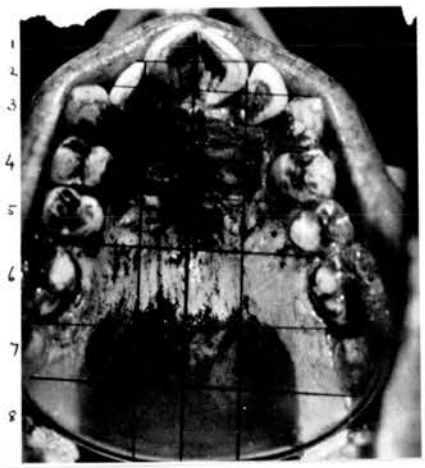
7.4.7.11 (f) None of the varieties of the voiceless retroflex stop discussed above ever occurs in word-final position. When Tamil speakers pronounce loan words with a final [t] they add a vowel to it. Thus belt is pronounced [bɛlʈɨ] and cricket is pronounced [kɾɪkʻɛtʻɨ].

7.4.8 [ɖ] voiced retroflex stop:-

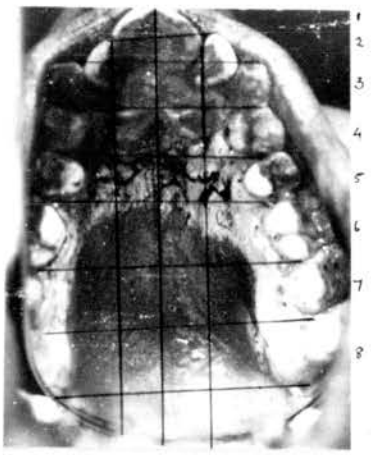
[ɖ] is articulated exactly like [ʈ] described in 7.4.7.1 above, except that during the articulation of [ɖ] the vocal cords vibrate, producing voice.

7.4.8.2 Three word palatograms are reproduced on the next page, which are divided into zones. Palatogram 33 is of the word [ɖɑbːɑː] (a tin, a can), illustrating the articulation of [ɖ]. In this word [ɖ] is followed by the back vowel [ɑː]. In the palatogram we see a very clear wipe-off in zone 6 - the palatal zone. There is a suggestion of a wipe-off in the pre-palatal zone, but in this zone the wipe-off is only on the sides. The middle of the pre-palatal

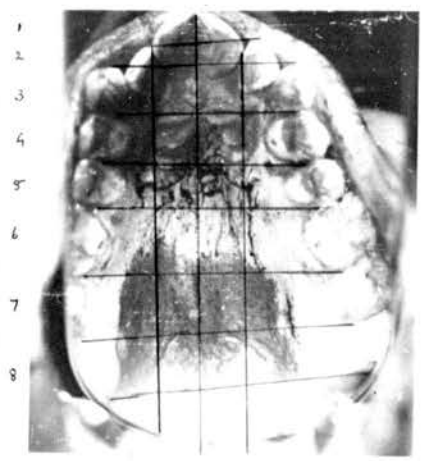
Articulation of [ɖ] ,[ɳɖ]



Pgm. 33
[ɖab:a:] (a tin, a can
[ɖ]followed by a back
vowel



Pgm. 34
[maɳɖɛ] (skull)
[ɳɖ]followed by a front
vowel

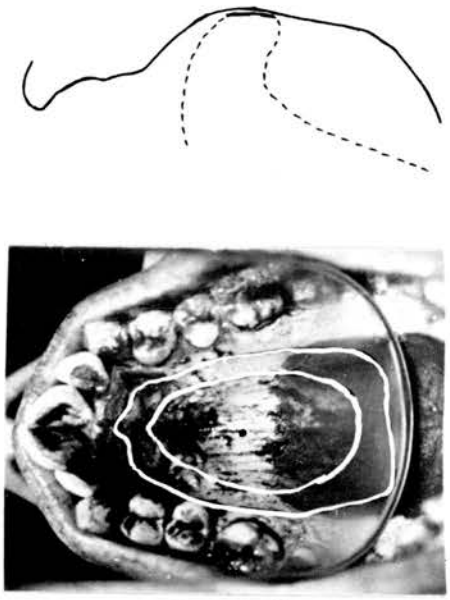


Pgm. 35
[p'u:ɳɖə](garlic)
[ɳɖ]followed by a back
vowel

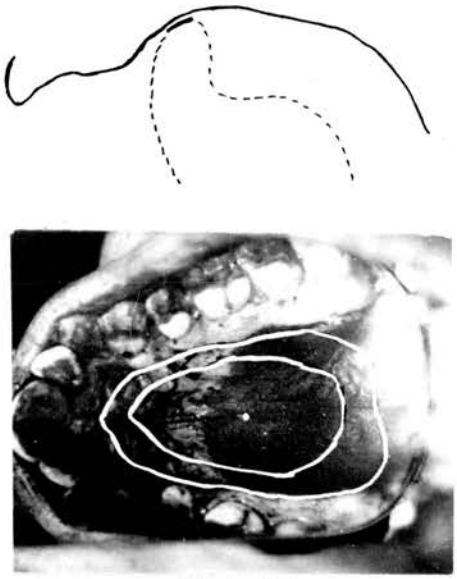
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

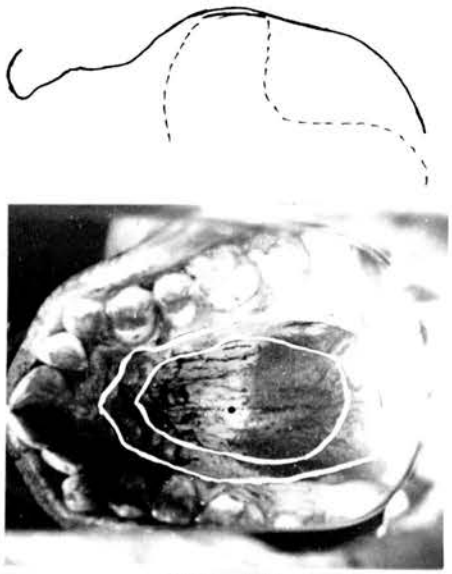
Articulation of [ɖ], [ɳɖ]



Pgm. 36
[ɖab:a:] (a tin, a can)
[ɖ]followed by a back vowel

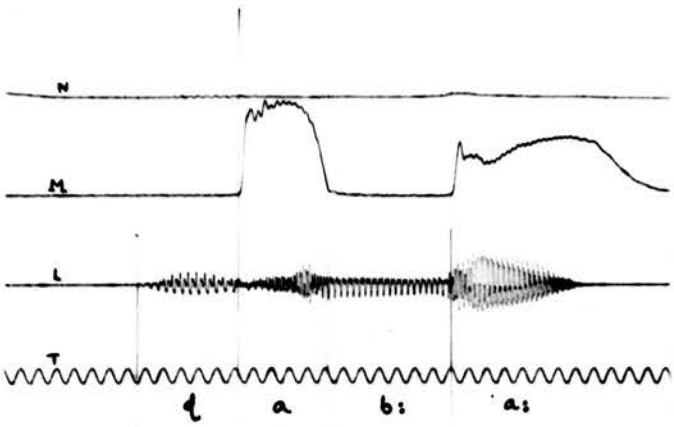


Pgm. 37
[maɳɖɛ] (skull)
[ɳɖ]followed by a front vowel

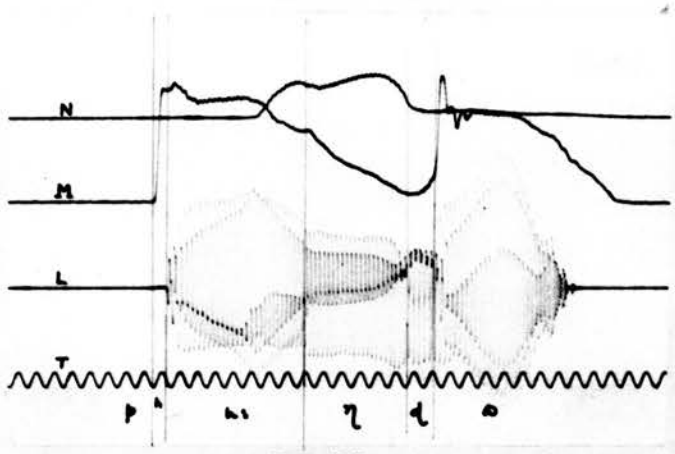


Pgm. 38
[pʻu:ɳɖɔ](garlic)
[ɳɖ]followed by a back vowel

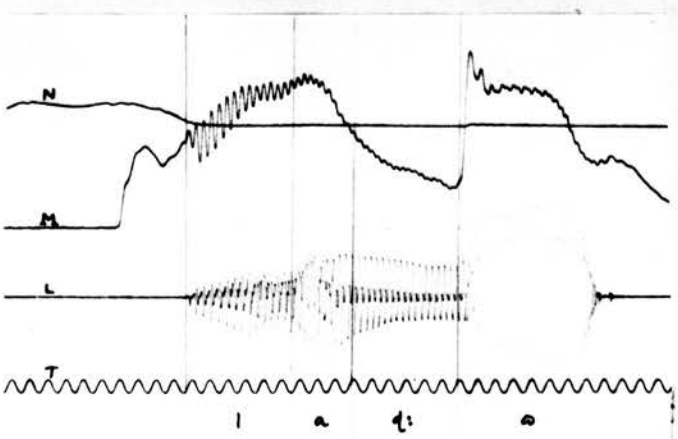
VOICED RETROFLEX STOP [ɖ]



Kgm. 127
[ɖab:a:] (a tin, a can) — initial [ɖ]



Kgm. 128
[p'a:ŋɖəX(garlic) — medial [ŋɖ]



Kgm. 129
[laɖ:ə] (a sweetmeat) — medial [ɖ:]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

zone is still coated with the marking medium. It is possible that the tip of the tongue that was curled back made contact with the palatal zone, while the sides of the tongue removed some marking medium from the sides of the pre-palatal zone. Palatograms 34 and 35 are of the words [mɑɳɖɛ] (skull) and [p'u:ɳɖɷ] (garlic) respectively. Since words could not be found with a front vowel and central vowel following word-initial [ɖ], these two palatograms are included here, illustrating the articulation of the homorganic nasal + stop consonant group [ɳɖ]. In one of the words the [ɳɖ] is followed by the front vowel [ɛ], while in the other it is followed by the back vowel [ɷ]. In palatogram 34 we see a wipe-off in zones 5 and 6 - the pre-palatal and palatal zones. It can also be seen that in zone 6 the wipe-off is only on the sides. In palatogram 35, on the other hand, the main wipe off extends from the end of zone 5 to the end of zone 6. With a back vowel following the consonant group [ɳɖ] the point of contact for the consonants is further backward in the mouth than when a front vowel follows them.

7.4.8.3 Palatograms 36, 37 and 38 are of the same three words as palatograms 33, 34 and 35. These are life-size ones, with a sectional diagram of the roof of the mouth accompanying each. The main wipe-off is marked on the sectional diagram. Also marked in

dashed lines is the position assumed by the main body of the tongue during the consonant closure.

Distribution of [ɖ]:-

7.4.8.4 (a) [ɖ] occurs initially as in [ɖəmbʌ̃] (vanity) and [ɖəb:ɑ:] (a tin, a can). In this position it is fully voiced. (see kymogram 127).

7.4.8.5 (b) [ɖ] occurs immediately after its homorganic nasal [ɳ] in word-medial position as in

[ɔɳɖɪ] (money-box)

[p'u:ɳɖɔ] (garlic)

(see kymogram 128).

7.4.8.6 (c) [ɖ:] - long voiced retroflex stop occurs only in intervocalic position in a few words like

[lɑɖ:ɔ] (a sweetmeat)

[ʋɑɖ:ɪ] (interest)

(see kymogram 129).

7.4.9 [k] Voiceless velar stop:-

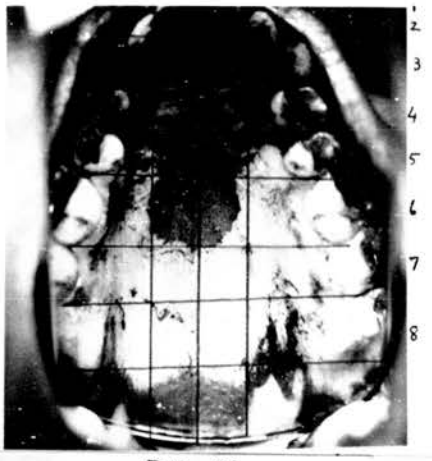
7.4.9.1 In articulating the voiceless velar stop [k], the 'back' of the tongue is made to touch the soft palate so that the oral passage of air is shut off completely. The nasal passage of air is blocked by keeping the soft palate raised. The air that is compressed by pressure from the lungs escapes with an explosive sound when the 'back' of the tongue is

removed from the soft palate. The vocal cords are apart - they do not vibrate during the articulation of [k].

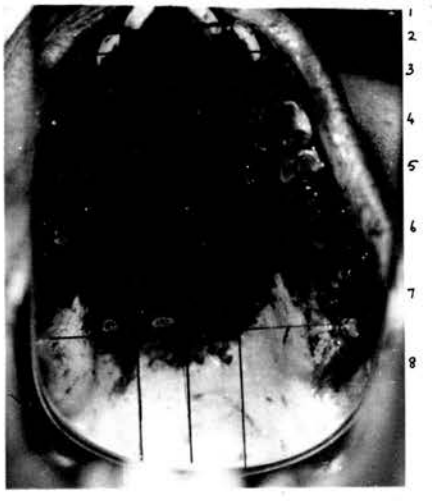
7.4.9.2 On the next two pages are two sets of three word-palatograms. Palatograms 39, 40 and 41 are of the words [ba:k'ɪ] (remainder), [k'ombɑ] (horn) and [mak:ɨ] (moron) respectively. In palatogram 39 which illustrates the articulation of [k] with a front vowel following it, we see a very clear wipe-off in zones 7 and 8, the post-palatal and velar zones. In palatogram 40 which illustrates the articulation of [k] with a back vowel following it, there is no wipe-off in zone 7 but a very clear wipe-off in zone 8. It is clear thus that with a back vowel following, [k] is articulated further backward in the mouth. Palatogram 41, which illustrates the articulation of [k] with a central vowel following it, shows a wipe-off in the velar zone. In palatogram 40, a bit of the marking medium is intact in the beginning of the velar zone, whereas in palatogram 41 the marking medium has been removed right from the beginning of the velar zone. Here again we see the post-palatal zone untouched by the tongue. So with a central vowel following, the articulation of [k] is neither too much forward nor too much backward.

7.4.9.3 Palatograms 42, 43 and 44 are of the same three words. These are life-size ones, accompanied by a sectional diagram of the roof of the mouth. The point

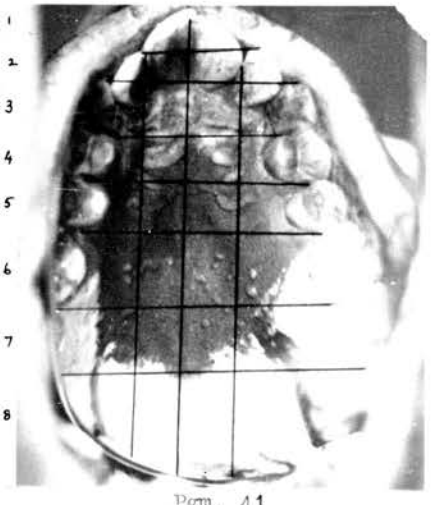
Articulation of [k]



Pgm. 39
[bɑ:k•ɪ] (remainder)
[k] followed by a
front vowel



Pgm. 40
[kʻombɑ] (horn)
[k] followed by a
back vowel

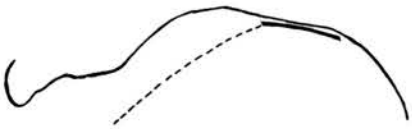


Pgm. 41
[mɑk:ɨ] (moron)
[k] followed by a
central vowel

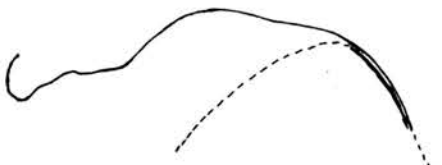
The Zones:

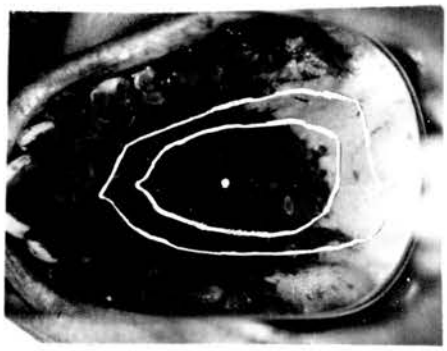
1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

Articulation of [k]

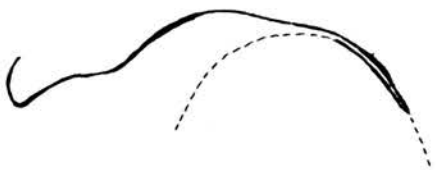


Pgm. 42
[ba:k·ɪ] (remainder)
[k] followed by a
front vowel





Pgm. 43
[kʻombɔ] (horn)
[k] followed by a
back vowel



Pgm. 44
[mak:ɨ] (moron)
[k] followed by a
central vowel

X-ray photograph of the tongue-position of the voiceless velar stop k with a front vowel following it. The picture was taken when the closure for the stop was maintained.

of contact of the tongue during the articulation of [k] is marked on the sectional diagram in each case. The position assumed by the main body of the tongue during the consonant closure is marked in dashed lines.

7.4.9.4 Following the palatograms is a photographic print of an X-ray picture. The picture shows the closure for [k] in a word in which a front vowel follows it.

7.4.9.5 Distribution of [k]:- The various varieties of [k] and their distributional possibilities in the dialect of Tamil under survey are discussed below.

7.4.9.6 (a) [kʻ] - slightly aspirated voiceless velar stop:-

[kʻ] occurs only in word-initial position with a vowel immediately following it, as in

[kʻɑp:ɑl] (ship)

[kʻɑ:lɪ] (empty)

(see kymograms 115, 116 and 117 in chapter VI)

7.4.9.7 (b) [k] - unaspirated voiceless velar stop:-

[k] occurs in word-initial consonant clusters as in [kɾɑ:mbɨ] (cloves) and in word-medial consonant groups as in [ɑkɾəmÃ] (unjust), [tʃɑkɾÃ] (wheel). (see kymogram 118 in chapter VI).

7.4.9.8 (c) [k•] - slightly long, unaspirated, tense, voiceless velar stop:-

[k•] occurs only intervocalically. It occurs in disyllabic words when the vowel immediately

preceding is long, [p'a:k•ɨ] (arecanut), [ɸa:k'ɨ] (gunnybag). It also occurs in words of more than two syllables, irrespective of the length of the preceding vowel, as in [p'a:k•əɾɛ̃] (I'll see), [ɸak•əɾɛ] (sugar), [k'aɾɨk•əl] (clouds), etc. (see kymograms 115 and 120 in chapter VI).

7.4.9.9 (d) [k:] - long, tense, unaspirated, voiceless velar stop:-

[k:] occurs only intervocalically, only in disyllabic words when the vowel preceding it is short, as in

[nak:ɨ] (lick - imp.)

[ak:a:] (elder sister)

(compare the duration of the voiceless velar stops in kymograms 85, 86 and 87 in chapter V).

7.4.9.10 (e) None of these varieties of [k] can occur finally in Tamil. Loan words with a final [k] are pronounced with an epenthetic vowel. Cake is pronounced [k'e:k•ɨ] by a Tamil speaker.

7.4.9.11 In connected speech of say, two words, if the first ends in a vowel and the next begins with a [k'], the initial [k'] of the second word is replaced by [k•] if there is no pause between the two words or if the context permits the realization of the two lexical words as one phonological word. Here again, there is an orthographic consideration. For example, avanai (him) and kuṯṯu (punch)are

written in Tamil avanaikkuṭṭu with the initial k of the second word doubled. This, in speech, is [avənɛkˑoṭˑo]. But in writing down the two words avanuṭaija kaɳɳa:ṭi (his glass) in connected prose, the orthography does NOT double the initial k of the second word. This, in speech, is [avəno:ɾəʁaɳ:a:ɾ^{ɪ}] if there is no pause between the two words (with the initial [kˑ] of the second word replaced by [ʁ])or [avəno:ɾə kˑaɳ:a:ɾ^{ɪ}] if there is a pause between the two words. This replacement of [kˑ] by [ʁ] does not ever happen if the orthography doubles the word-initial k of the second word in writing down connected prose.

7.4.10 [g] Voiced velar stop:-

7.4.10.1 [g] is articulated just like [k] described in 7.4.9.1 above, except that during the articulation of [g] the vocal cords vibrate, producing voice. The articulation of [g] is further forward in the mouth if a front vowel follows it as in [gɪɾɪdʒa:] (a proper name); it is further backward in the mouth when followed by a back vowel as in [gɒɳɖɒ] (bomb).[9]

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9. No word could be chosen with [g] alone effecting a wipe-off in a palatogram and hence no palatograms are included to illustrate the articulation of [g]. A few are reproduced later to illustrate the articulation of [ŋg]. (see 7.6.6.2 and palatograms 82, 83 and 84).

Distribution:-

7.4.10.2 (a) [g] occurs initially in a number of loan words that occur very freely in speech, as in

[gɑnɐ̃] (weight)

[go:n̪d̪o] (glue)

Word-initial [g] is fully voiced. (see kymogram 130).

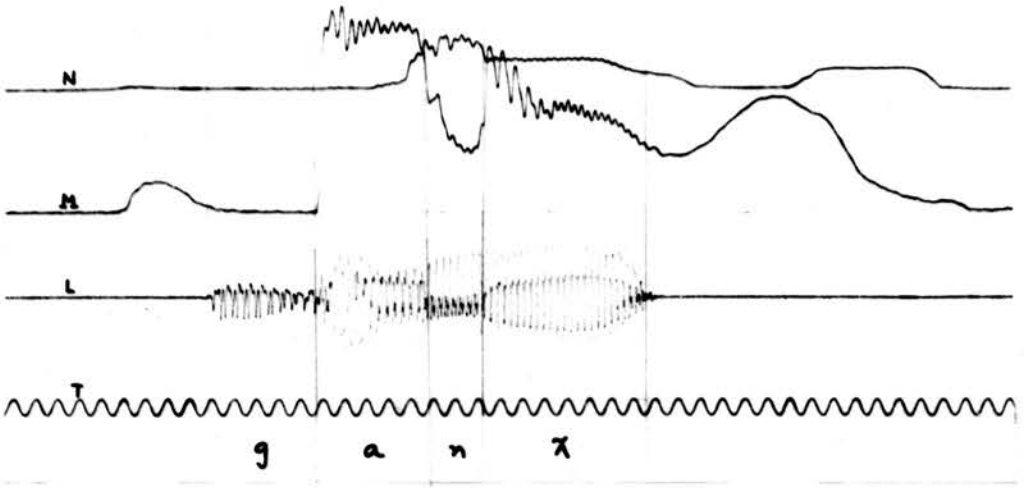
7.4.10.3 (b) [g] occurs in initial consonant clusters as in [gɾɑ:mɐ̃] (village).

7.4.10.4 (c) [g] occurs in the medial consonant group [ŋg] as in [ʈ‘ɑŋgɛ] (younger sister), [p‘ɑŋgɨ] (share).

7.4.10.5 (d) [g] does not occur finally in a word. In pronouncing loan words with a final [g], Tamil speakers add a vowel to the final [g]. In so doing, they lengthen the [g] if the vowel preceding it is short. Thus egg is pronounced [jɛg:ɨ], and mug is pronounced [mɑg:ɨ].

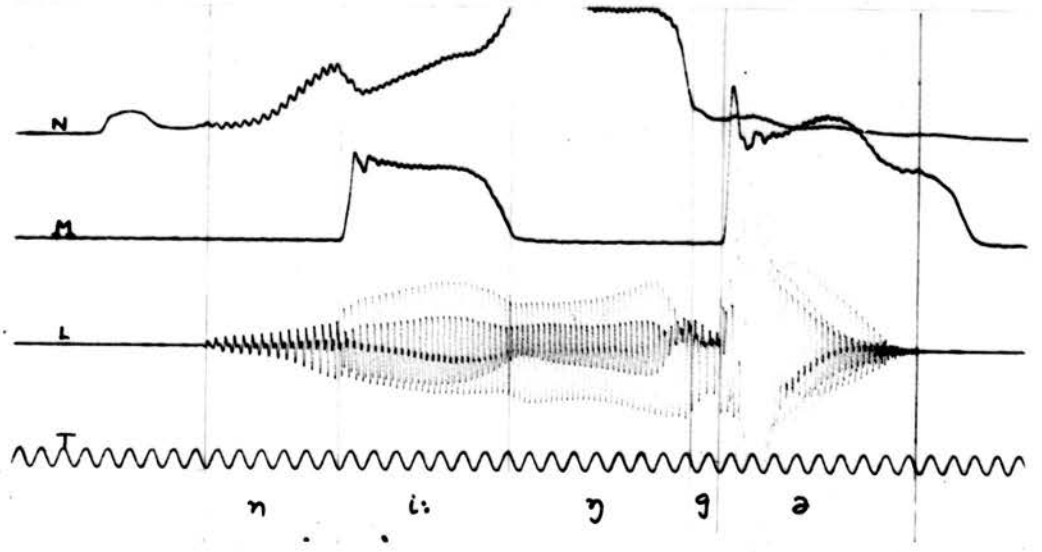
7.4.10.6 (e) [g:] - A long [g] with the duration of closure prolonged only in pronouncing loan words as described above.

VOICED VELAR STOP [g]



Kgm. 130

[ganχ] (weight) — Initial [g]



Kgm. 131

[ni:ŋga] (you - plural) — medial [ŋg]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.5 AFFRICATES:-

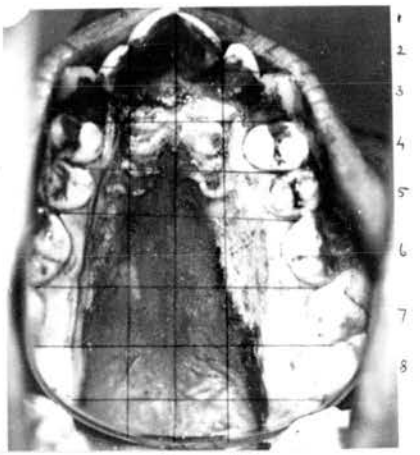
7.5.1 [tʃ] Voiceless palato alveolar affricate:-

7.5.1.1 In articulating [tʃ] the tip and blade of the tongue make contact with the hinder part of the teeth-ridge, thus shutting off the oral passage of air completely. The soft palate is raised and thus the nasal passage of air is shut off, too. The tip and blade of the tongue are removed from the hinder part of the teeth ridge in such a way that the homorganic fricative [ʃ] is heard. The vocal cords do not vibrate during the articulation of [tʃ].

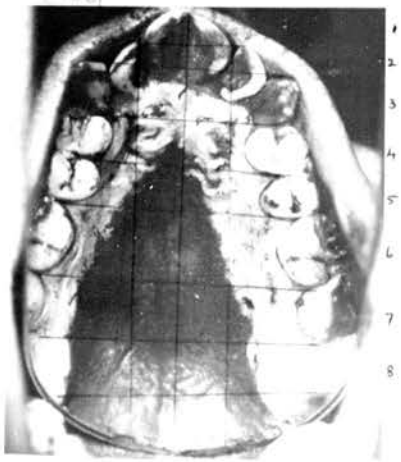
7.5.1.2 Three word-palatograms, each one divided into zones, are reproduced in the following page. They are of the words [pʻɪ t͡ʃɛ] (alms), [pʻu:t͡ʃʻo] (paintings) and [at͡ʃɨ] (print), with the affricate immediately followed by a front vowel, a back vowel and a central vowel respectively. Palatogram 45, which is an illustration of the affricate articulation when it is followed by a front vowel, shows a wipe-off in zones 3 and 4 - the alveolar and post-alveolar zones. Palatogram 45, which is an illustration of the articulation of the affricate when a back vowel follows it, shows a wipe-off in the hinder part of the alveolar zone, extending up to half of the post-alveolar zone. Comparing these two palatograms we see that in palatogram 46 there is more wipe-off in the post-alveolar zone than in palatogram 45. This illustrates that with a back

Articulation of [ʧ]

Pgm. 45
[pʻɪ t:ʃɛ] (alms)
[ʧ] followed by a
front vowel



Pgm. 46
[pʻu:tˑʃɑ] (painting)
[ʧ] followed by a
back vowel

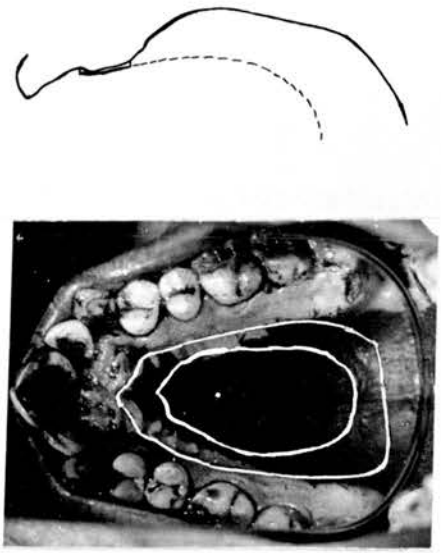


Pgm. 47
[a t:ʃ ɨ] (print-n.)
[ʧ] followed by a
central vowel

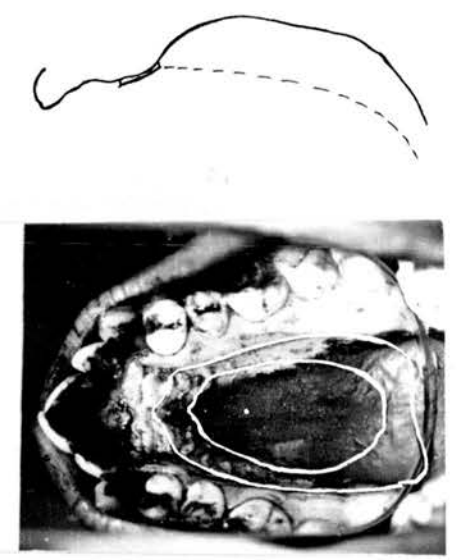
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. pal tal 7. post-palatal 8. velar

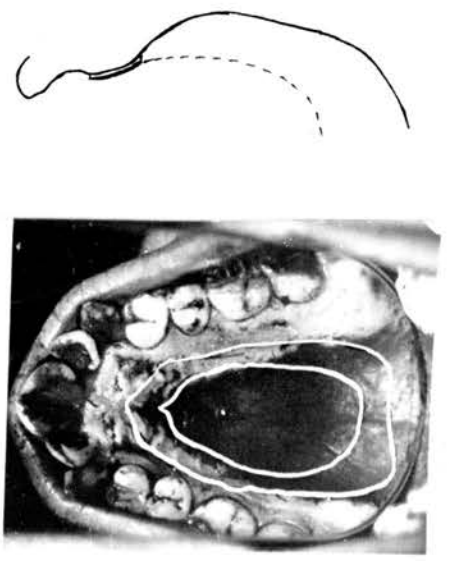
Articulation of [ʧ]



Pgm. 48
[pʻɪ tːʃɛ] (alms)
[ʧ] followed by a front vowel



Pgm. 49
[pʻuːtːʃɑ] (painting)
[ʧ] followed by a back vowel



Pgm. 50
[atːʃ ɨ] (print-n.)
[ʧ] followed by a central vowel

vowel following, the affricate is articulated further backward in the mouth. Palatogram 47 illustrages the affricate articulation with a central vowel following it and we do not see any difference between this and palatogram 45.

7.5.1.3 Palatograms 48, 49 and 50 are of the same three words discussed above, in that order. These are life-size ones and each one is accompanied by a sectional diagram of the roof of the mouth. The point of contact of the tongue during the articulation of [tʃ] is marked on the sectional diagrams, as also the position assumed by the main body of the tongue. The latter is marked in dashed lines.

Distribution of [tʃ]:-

7.5.1.4 (a) [tʃ] occurs initially in very few words as in

[tʃ i:]	(fie!)
[tʃ a̤n̤d̤a̤nʌ̃]	(sandalwood paste)
[tʃ a̤n̤d̤ɾʌ̃]	(moon)
[tʃ aʈɳɪ]	(chutney)

7.5.1.5 (b) [tʃ] occurs in medial consonant groups as in

[aɾtʃ anɛ]	(worship)

7.5.1.6 (c) [t͡ʃ] - the voiceless palato alveolar affricate with the stop element slightly prolonged - occurs in intervocalic position only. It occurs in disyllabic words if the preceding vowel is long, as in [mu:t͡ʃo] (breath). It

also occurs in words of more than two syllables, irrespective of the length of the preceding vowel, as in [pʻɪt͡ʃʻɛkʻɑːɾɐ̃] (beggarman).

7.5.1.7 (d) [t͡ʃː] - the voiceless palato alveolar affricate with the stop element prolonged considerably - occurs in intervocalic position only, and that too only in disyllabic words. The vowel preceding this is always short, as in

[pʻɑt͡ʃːɛ] (green)

[kʻɔt͡ʃːɪ] (stick - n.)

7.5.1.8 (e) [tʃ] does not occur finally. Loan words with a final [tʃ] are pronounced with an additional vowel at the end. The word <u>church</u> is pronounced [tʃ ɑɾtʃ ɨ].

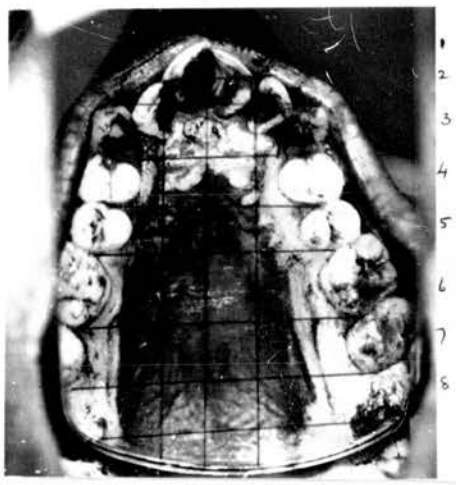
7.5.1.9 In connected speech of say, two words, if the first word ends in a vowel and the second begins with a [ɕ] the initial [ɕ] of the second word is replaced by [t͡ʃʻ] if there is no pause between the two words, or if the two lexical items can be realized as one phonological unit. Also, this happens only if the orthography doubles the word-initial consonant symbol of the second word. In Tamil orthography [ɕ] and [tʃ] are represented by the same symbol. The symbol is written once to represent [ɕ] and twice to represent [tʃ]. In writing down compound words and connected prose, the orthography at times doubles the word-initial symbol representing [ɕ]. For example, the word for <u>shirt</u> is [ɕɑʈːɛ] which is spelt <u>tʃɑʈʈɑi</u>

The words black shirt are written karupputʃ tʃ a ʈ ʈai with a double tʃ. This expression is always [k'arip'it'ʃaʈ'ɛ] in speech. There are instances when the orthography does not double the word-initial consonant symbol representing [ɸ]. For example, let us take the expression "the pot that someone brought". This is made up of three words kɔɳʈu, vaɲɲa and tʃaʈʈi. These three words, in isolation, are pronounced [k'oɳɖo], [vaɲɲə] and [ɸaʈ:ɪ]. In writing down the whole expression, the orthography does not double the tʃ of the third word and in speech, this expression is always [k'oɳɖovaɲɲə ɸaʈ:ɪ].

7.5.2 [ʤ] Voiced palato alveolar affricate:-

7.5.2.1 [ʤ] is articulated exactly like [tʃ] described in 7.5.1.1 above, except that during the articulation of [ʤ] the vocal cords vibrate, producing voice.

7.5.2.2 Palatograms 51 and 52 are of the words [ʤɪb:a:] (a male upper garment) and [ʤambã] (pride) respectively. In both palatograms we see a wipe-off in zone 3 (alveolar zone) and part of zone 4 (post-alveolar zone). Palatograms 53 and 54 are of the same two words. These are life-size ones and on the accompanying sectional diagram of the roof of the mouth, the area of contact of the tongue during the articulation of [ʤ] and the position assumed by the main body of the tongue during the consonant articulation are marked, the latter in dashed lines.

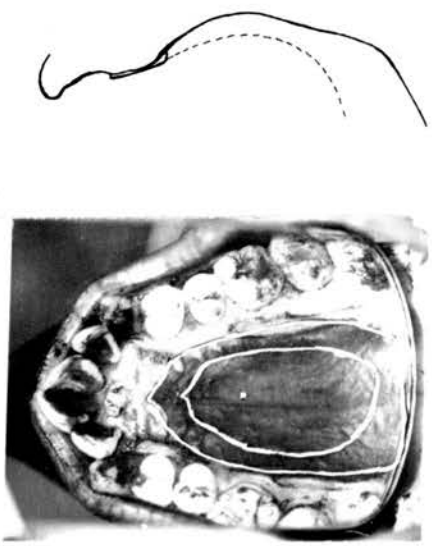


Pgm. 51
[ʤɪ b:a:] (a garment)
[ʤ] followed by a
front vowel

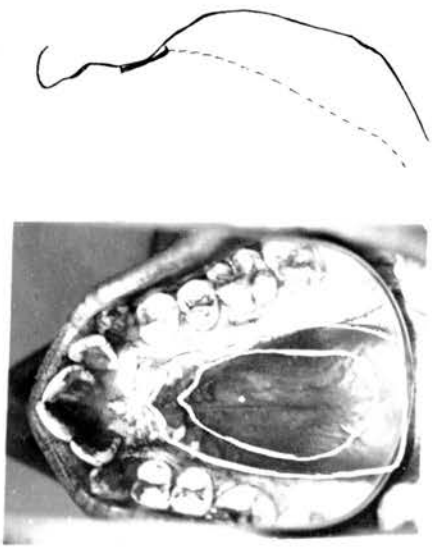
Pgm. 52
[ʤambɛ̃] (pride)
[ʤ] followed by a
back vowel

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. Post-palatal 8. velar



Pgm. 53
[ʤɪ b:a:] (a garment)
[ʤ] followed by a
front vowel



Pgm. 54
[ʤambɛ̃] (pride)
[ʤ] followed by a
back vowel

Distribution of [ʤ]:-

7.5.2.3 (a) [ʤ] occurs initially as in

[ʤi:ɾɳÃ] (digestion)

[ʤil:a:] (district)

[ʤa:ɽɪ] (jar)

[ʤo:ɽɪ] (pair)

Initial [ʤ] is fully voiced. (see kymogram 132).

7.5.2.4 (b) [ʤ] occurs intervocalically as in

[ra:ʤa:] (king)

[ro:ʤa:] (rose)

[p'u:ʤɛ] (worship)

[jo:ʤənɛ] (thought - n.)

The vowel preceding intervocalic [ʤ] is always long.

7.5.2.5 (c) [ʤ] occurs immediately after the palatal nasal [ɲ] as in

[p'aɲʤɨ] (cotton)

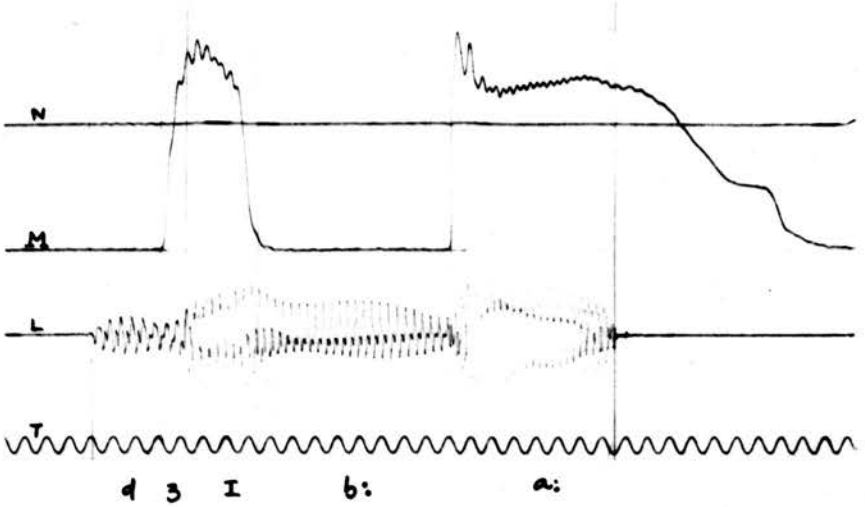
[k'aɲʤɪ] (gruel)

(see kymogram 133)

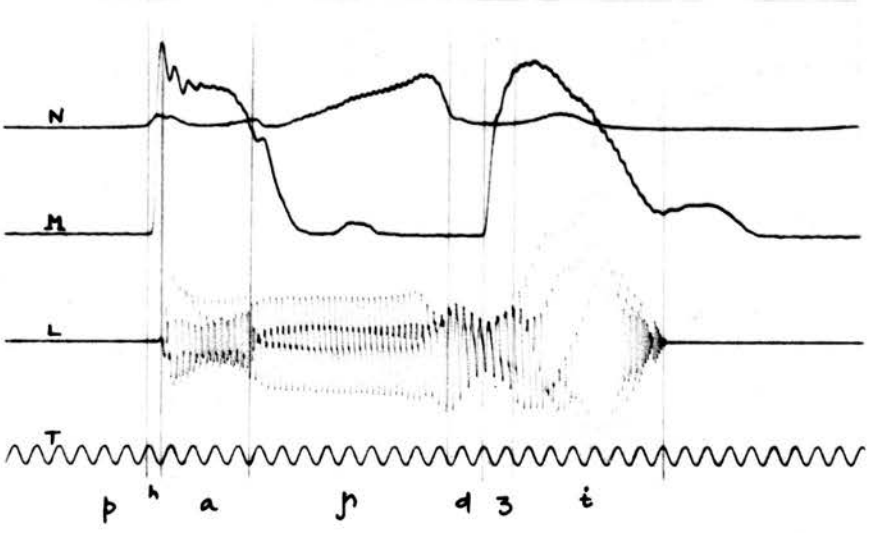
7.5.2.6 (d) [d͡:ʒ] - the voiced palato alveolar affricate with the stop element prolonged occurs only intervocalically. The vowel preceding it is always short. e.g., [bad͡:ʒɪ] (a savoury).

7.5.2.7 (e) [ʤ] does not occur finally in a word.

VOICED PALATO-ALVEOLAR AFFRICATE [ʤ]



Kgm. 132
[ʤɪ b:a:] (a male garment) — initial [ʤ]



Kgm. 133
[p'aɲʤi] (cotton) — medial [ɲʤ]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.6 NASALS:-

7.6.1 [m] Voiced bilabial nasal:-

7.6.1.1 In articulating [m] the two lips are brought close together so that the oral passage of air is shut off completely. The soft palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice. During the articulation of [m], the tongue is free to assume any position and it assumes the position of the vowel that immediately follows the nasal.

Distribution:-

7.6.1.2 (a) [m] occurs initially as in [mɑ:ɽɨ] (cow), [mɑɳɪ] (bell). Initial [m] is fully voiced. (see kymogram 134).

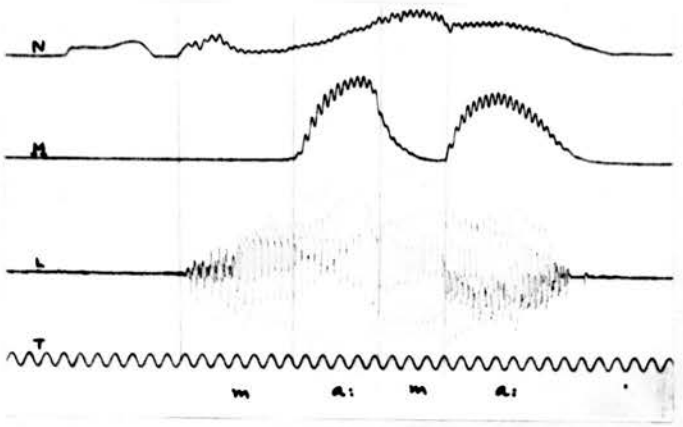
7.6.1.3 (b) [m] occurs intervocalically as in [ɒm] (husk), [bu:mɪ] (earth). Intervocalic [m] is very short in duration. (see kymogram 135).

7.6.1.4 (c) [m] occurs in the medial consonant group [pm] in only one word. [ɒpmɑ:] (a savoury made with semolina).

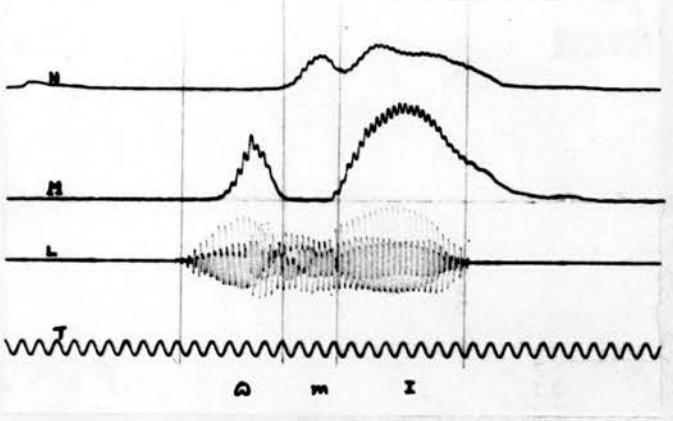
7.6.1.5 (d) [m] occurs in the medial consonant group [mb] as in [k'ɑmbɪ] (wire), [p'ɑ:mbɨ] (snake).

7.6.1.6 (e) [m] occurs finally in a word only when something is read aloud. In colloquial speech, word-final [m] is elided and the vowel preceding it is nasalized instead. Thus the word tree is [mɑɾəm] in its citation form. In

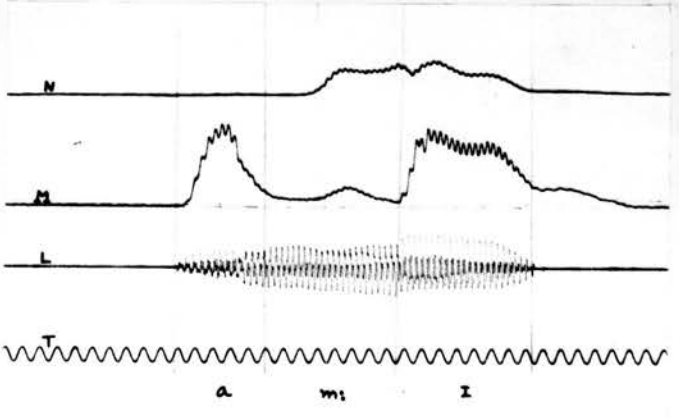
VOICED BILABIAL NASAL [m]



Kgm. 134
[ma:ma:] (uncle) — initial [m] is fully voiced



Kgm. 135
[ɑmɪ](husk) — intervocalic [m]



Kgm. 136
[am:ɪ] (grinding stone) — intervocalic [m:]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

colloquial speech the word is [maɾÃ].

7.6.1.7 [m:] long voiced bilabial nasal:-

[m:] occurs only intervocalically, as in

[kʻam:ɪ] (less)

[am:a:] (mother)

The duration of intervocalic [m:] is considerably longer than that of intervocalic [m]. (compare kymograms 135 and 136).

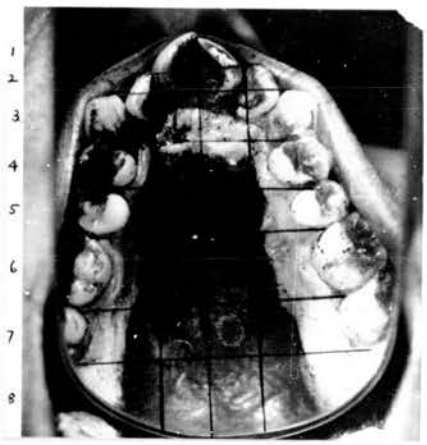
7.6.2 [n] Voiced alveolar nasal:-

7.6.2.1 In articulating [n] the tip of the tongue makes a firm contact with the teeth-ridge, thus shutting off the oral supply of air. The soft-palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice.

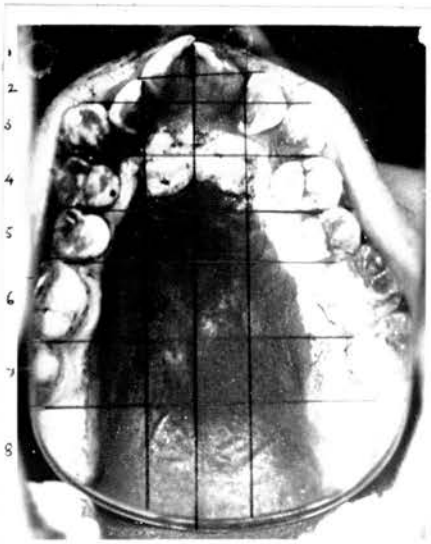
7.6.2.2 Three word-palatograms are reproduced on the next page. Palatograms 55, 56 and 57 are of the words [ni:] (you), [nã:] (I) and [nambɨ] (believe) respectively. In palatogram 55 there is a clear wipe-off in the alveolar zone. In palatograms 56 and 57 the wipe-off begins in the alveolar zone but extends into the post-alveolar zone. This is ascribed to the fact that the latter two are palatograms of words with a back vowel following the [n] in each case. Another thing to notice is that in all the three palatograms the dental and the denti-alveolar zones are totally free from wipe-off. This

Articulation of n

Pgm. 55
[ni:] (you)
[n] followed by a front vowel



Pgm. 57
[nambi] (believe)
[n] followed by a back vowel



Pgm. 56
[nã:] (I)
[n] followed by a back vowel

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

shows that word-initial [n] is alveolar.[10]

7.6.2.3 The next four palatograms (Palatograms 58,59, 60 and 61) illustrate another important factor. In Intervocalic position short [n] and long [n:] occur. Palatograms 58 and 59 are of the words [p'ɑnɪ] (dew) and [mɑ:nɐ̃] (shame) respectively. Palatograms 60 and 61 are of the words [p'ɑn:ɪ] (pig) and [p'on:o] (gold) respectively. In the last two the wipe-off is more marked than in the first two. Intervocalic [n] is of very short duration and the tip of the tongue is removed very quickly from the alveolar ridge after the contact is made. Intervocalic [n:] is of considerably longer duration than intervocalic [n] and the more marked wipe-off in palatograms 60 and 61 show that the tip of the tongue has made firmer contact and for a longer duration with the alveolar ridge. These palatograms also reveal the 'fronter' and 'backer' articulation of the [n] depending upon the vowel that follows it.

7.6.2.4 Palatograms 62 and 63 are of the words [ni:] (you) and [nɑ̃:] (I). These are life-size ones accompanied by a sectional diagram of the roof of the mouth. The area of contact of the tongue during the articulation of [n] and the position assumed by the main body of the

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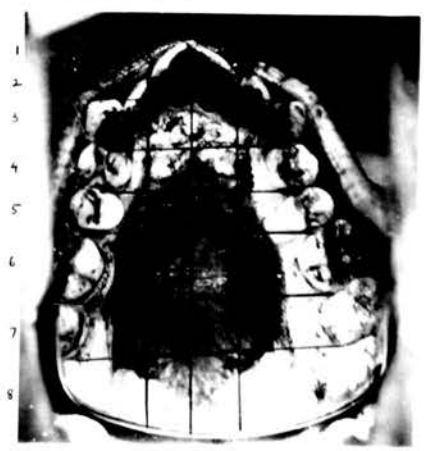
10. This is mentioned here because traditional Tamil grammarians say that initial [n] is dental. This is because of the two orthographic symbols in Tamil representing [n], the one that is placed next to the symbol representing [t] in the arrangement of orthographic symbols occurs in initial position in spelling. In the speech of every Tamil speaker the present writer has heard initial [n] is alveolar and not dental.

Articulation of [n] and [n:]

Pgm. 58
[pʻa nɪ] (dew)
Intervocalic [n]

Pgm. 59
[ma:nɴ̃] (shame)
Intervocalic [n]

Pgm. 60
[pʻa n:ɪ] (pig)
Intervocalic [n:]

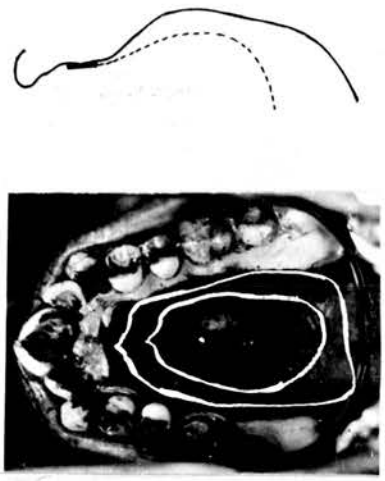


Pgm. 61
[pʻon:ɷ] (gold)
Intervocalic [n:]

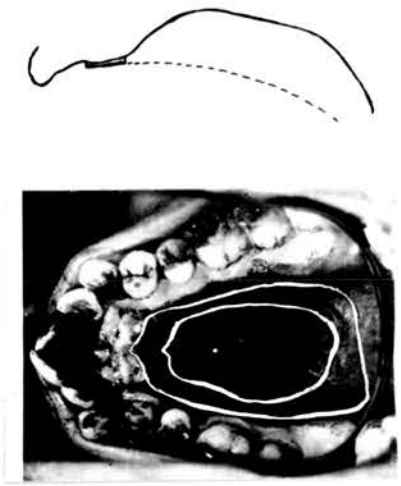
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

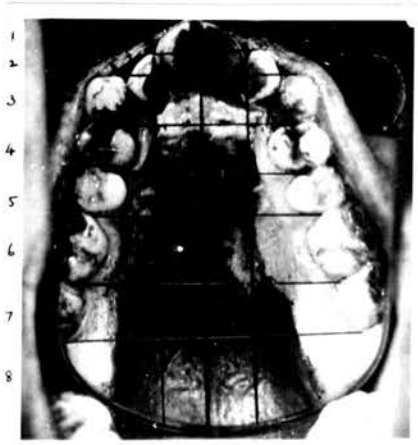
Articulation of [n]



Pgm. 62
[ni:] (you)
[n] followed by a
front vowel



Pgm. 63
[nɑ̃:] (I)
[n] followed by a
back vowel



Pgm. 64
[mi:n] (fish)
word-final [n]

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

tongue are marked on the sectional diagram, the latter in dashed lines.

7.6.2.5 Palatogram 64 is of the word [mi:n] (fish), illustrating the articulation of word-final [n]. The wipe-off is in the alveolar zone.

Distribution of [n]:-

7.6.2.6 (a) [n] occurs initially in words as in

[nɑ:kʻɨ] (tongue)

[nɑ:lɨ] (four)

Word-initial [n] is fully voiced. (see kymogram 137).

7.6.2.7 (b) [n] occurs intervocalically, as in [pʻɑnɪ] (dew), [pʻɑ:nɛ] (pot). Intervocalic [n] is very short. (see kymogram 138).

7.6.2.8 (c) A post-alveolar [n̠] occurs in the consonant group [n̠ɾ] as in [won̠ɾɛ] (one and a half).

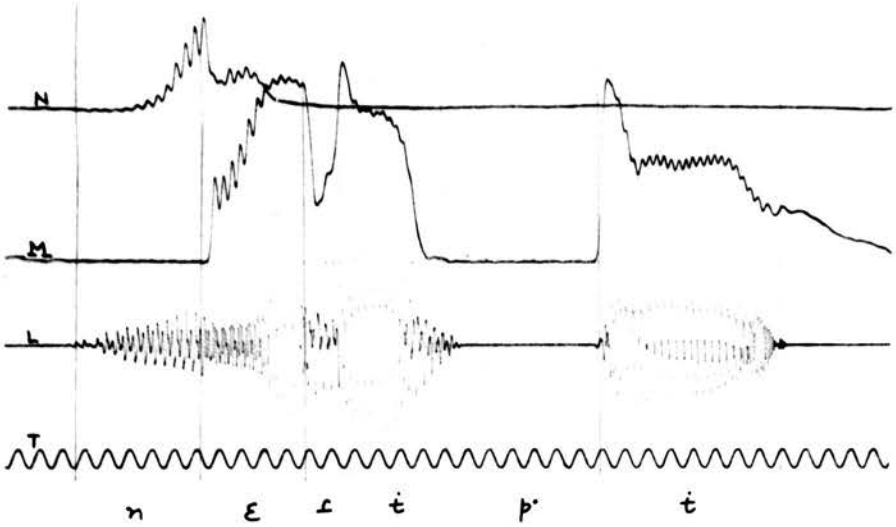
7.6.2.9 (d) [n] occurs finally in words like [t̠ʻe:n] (honey), [mi:n] (fish). In several words which have a final [n] in literary/formal Tamil, in colloquial Tamil there is a nasalized vowel at the end. Thus what is [nɑ:n] in formal Tamil is [nɑ̃:] in colloquial Tamil. There are other words with a final [n] to which a final vowel is added in colloquial speech. In doing so, the [n] is lengthened if the vowel preceding it is short. Thus the word for gold is either [pʻon] or [pʻon:o] while

that for lice is either [p'e:n] or [p'e:nɨ]. Where [n] occurs in final position, it is fully voiced. (see kymogram 139).

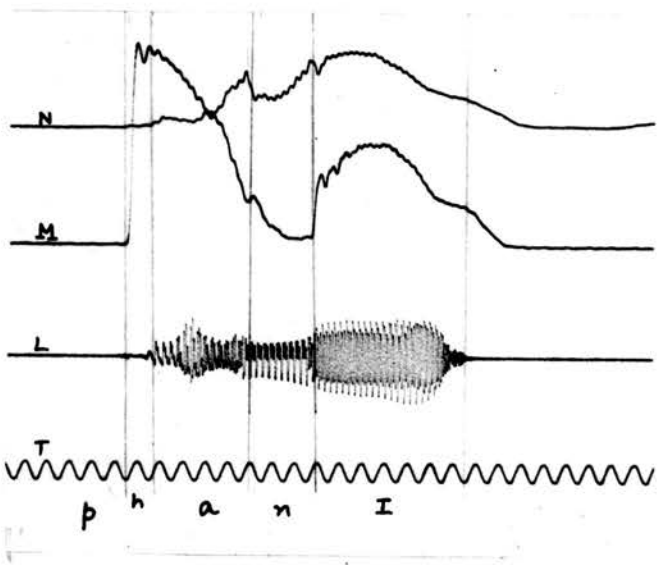
7.6.2.10 [n:] long voiced alveolar nasal:-

[n:] occurs only intervocalically. The vowel preceding it is always short, as in [p'an:ɤ] (pig), [man:ɪ] (elder sister-in-law). Intervocalic [n:]is considerably longer than intervocalic [n]. (see kymogram 140).

VOICED ALVEOLAR NASAL [n]



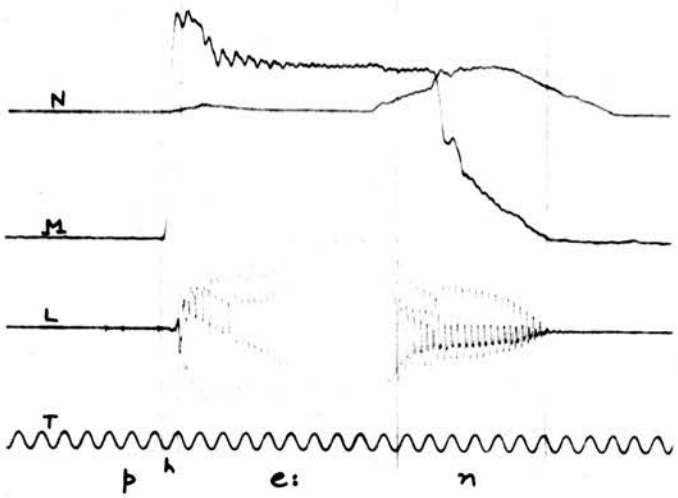
Kgm. 137
[nɛɾip'i] (fire) — initial [n]



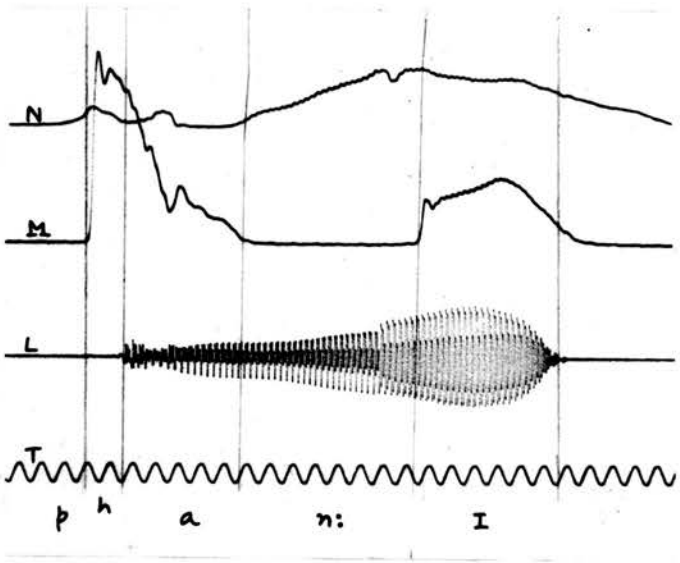
Kgm. 138
[p'anɪ](dew) — intervocalic [n]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

VOICED ALVEOLAR NASALS [n] AND [n:]



Kgm. 139
[p'e:n] (lice) — word-final [n]



Kgm. 140
[p'ɐn:ɪ] (pig) — Intervocalic [n:]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.6.3 [n̪] Voiced dental nasal:-

7.6.3.1 The tip and blade of the tongue are made to touch the upper front teeth, thus shutting off the oral passage of air. The soft palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice.

7.6.3.2 Three word-palatograms are reproduced on the next page. Palatograms 65, 66 and 67 are of the words [p'ɑn̪d̪ɪ] (a row), [p'on̪d̪o] (hole) and [p'ɑn̪d̪i] (ball) respectively. In palatograms 65 and 67 we see a wipe-off extending from the dental zone to the alveolar zone, but in palatogram 66 (of the word [p'on̪d̪o]) the wipe-off extends to the post-alveolar zone as well. With a back vowel following it, [n̪] is articulated further backward in the mouth.

Distribution

7.6.3.3 [n̪] occurs only in the medial consonant group [n̪d̪] as in

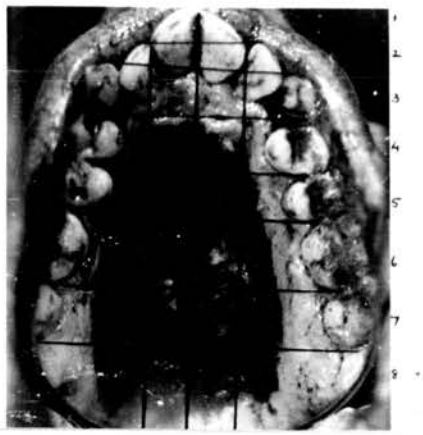
[p'ɑn̪d̪i]	(ball)
[k'ɑn̪d̪ɑl]	(rags)
[ʋɑn̪d̪i]	(having come)
[p'on̪d̪o]	(hole)

7.6.4 [ɲ] Voiced palatal nasal:-

7.6.4.1 The oral passage of air is shut off completely by the front of the tongue making a firm contact

Articulation of [n̪]

Pgm. 65
[p'ʌn̪dɪ] (a row)
[n̪] followed by a
front vowel



Pgm. 66
[p'ond̪o] (hole)
[n̪] followed by a
back vowel

Pgm. 67
[p'ʌn̪d̪ɨ] (ball)
[n̪] followed by a
central vowel

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

with the hard palate. The soft palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice.

Distribution of [ɲ]:-

7.6.4.2 (a) [ɲ] occurs initially in a few words. For example:

[ɲɑ:nÃ] (wisdom)

[ɲɑ:βəñÃ] (memory)

[ɲɑ:t̪ʻɪkʻəɻəmɛ] (Sunday)

7.6.4.3 (b) [ɲ] occurs medially in the consonant group [ɲdʒ]. In this consonant group [ɲ] is not palatal, but palato-alveolar, homorganic with the immediately following palato-alveolar affricate [dʒ], as in [kʻaɲdʒɪ] (gruel).

7.6.4.4 (c) [ɲ] does not occur in any other position.

7.6.4.5 The palatograms reproduced on the next page illustrate the palato-alveolar articulation of [ɲ] when it is followed by [dʒ]. Palatograms 68 and 69 are of the words [ɪɲdʒɪ] (ginger) and [mɑɲdʒɷ] (a proper name) respectively. In both palatograms, the pre-palatal and the palatal zones are totally free from any wipe-off. In palatogram 68 the post-alveolar zone has very little wipe-off whereas in palatogram 69 there is a total wipe-off in the post-alveolar zone. This illustrates the more backward

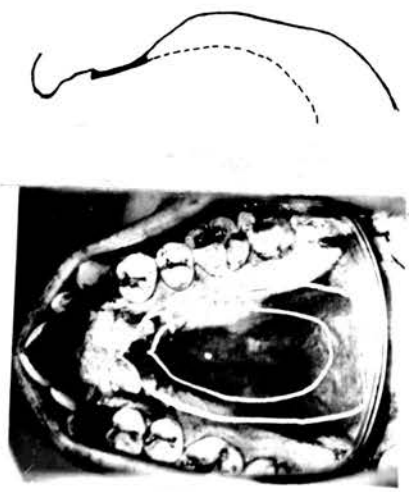
Articulation of [ɹdʒ]

Pgm. 68
[ɪɹdʒɪ] (ginger)
[ɹdʒ] followed by a front vowel

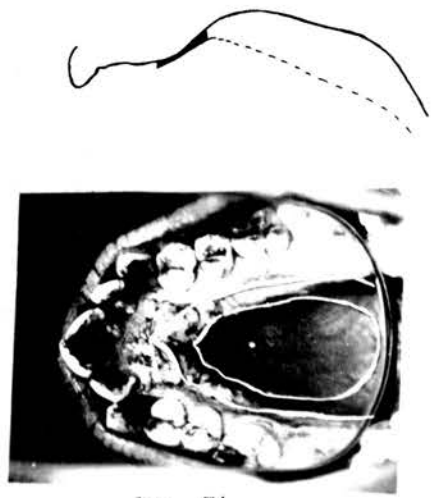
Pgm. 69
[maɹdʒo] (proper name)
[ɹdʒ] followed by a back vowel

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar



Pgm. 70
[ɪɹdʒɪ] (ginger)
[ɹdʒ] followed by a front vowel



Pgm. 71
[maɹdʒo] (proper name)
[ɹdʒ] followed by a back vowel

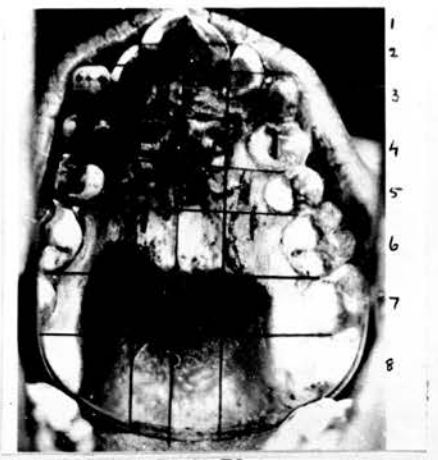
articulation in the mouth of [ɲdʒ] when a back vowel follows it. The same palatograms, reduced to life-size, are reproduced again (palatograms 70 and 71) and the area of contact of the tongue during the consonant articulation and the position assumed by the main body of the tongue are marked in the accompanying sectional diagrams of the roof of the mouth.

7.6.5 [ɳ] Voiced retroflex nasal:-

7.6.5.1 The tip of the tongue is curled back and the curled back tip makes a contact with the hard palate, thus shutting off the oral passage of air. The soft palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice.

7.6.5.2 On the following page are reproduced three word palatograms. Since [ɳ] does not occur initially and since intervocalic [ɳ] is a nasal flap, words were chosen with intervocalic [ɳ:] for palatographic investigation. In palatogram 72 of the word [pɑɳ:ɛ] (farm) we see a wipe-off in the palatal zone, whereas in palatogram 73 of the word [pʻoɳ:ɔ] (girl), the wipe-off starts in the latter half of the palatal zone and extends well into the post-palatal zone. In palatogram 74 of the word [mɑɳ:ɨ] (mud) there is a wipe-off in the palatal zone which extends a bit into the post-palatal zone. These palatograms

Articulation of [ŋ:]



Pgm. 72
[pʻaŋ:ɛ] (farm)
[ŋ:] followed by a front vowel

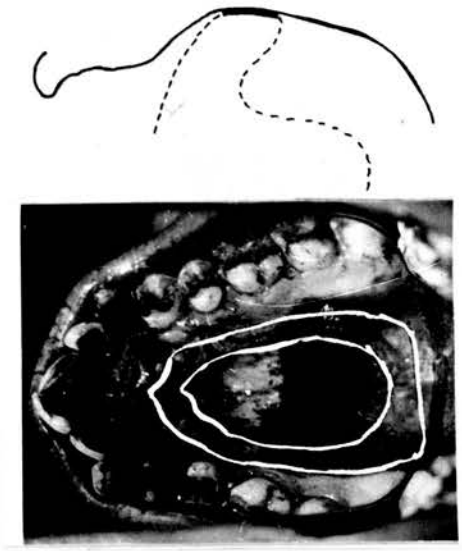
Pgm. 73
[pʻoŋ:ɔ] (girl)
[ŋ:] followed by a back vowel

Pgm. 74
[maŋ:ɨ] (mud)
[ŋ:] followed by a central vowel

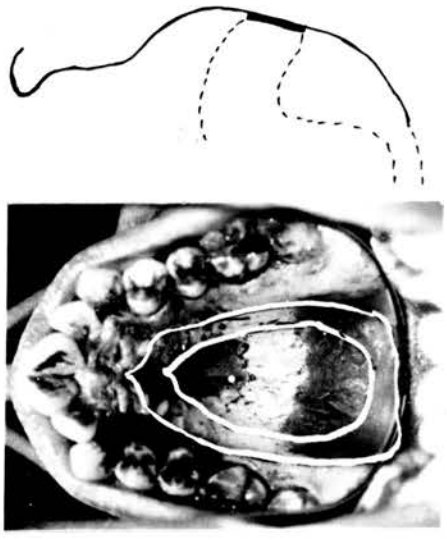
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

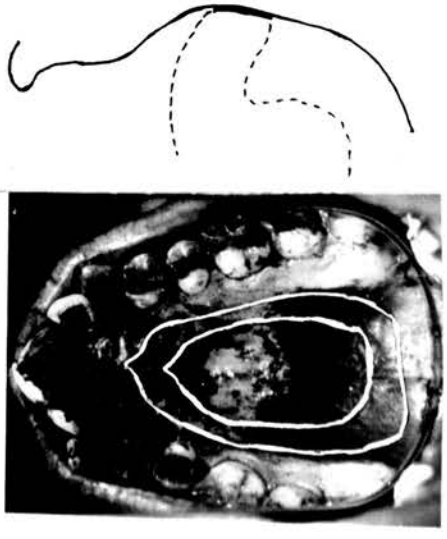
Articulation of [ŋ:]



Pgm. 75
[pʿaŋ:ɛ] (farm)
[ŋ:] followed by a front vowel



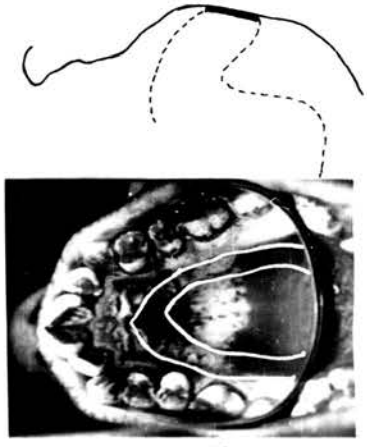
Pgm. 76
[pʿoŋ:ɔ] (girl)
[ŋ:] followed by a back vowel



Pgm. 77
[maŋ:ɨ] (mud)
[ŋ:] followed by a central vowel

Articulation of final [ŋ]

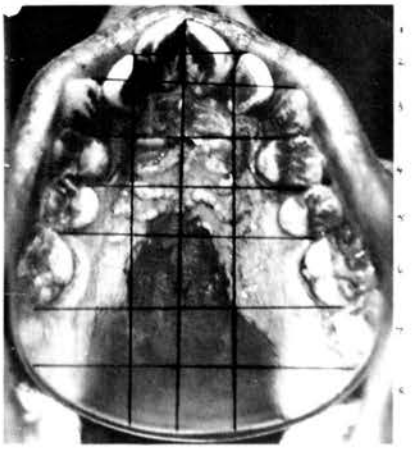
Pgm. 78
[a:ŋ] (male)
Word-final [ŋ]



Pgm. 79
[a:ŋ] (male)
Word-final [ŋ]

Articulation of
intervocalic [-ŋ-]

Pgm. 80
[maŋɪ] (bell)
intervocalic [-ŋ-]



Pgm. 81
[maŋɪ] (a measure of weight)
intervocalic [-ŋ-]

The Zones:
1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

illustrate that with a front vowel following it, [ɳ] is articulated further forward in the mouth and with a back vowel following it, [ɳ] is articulated further backward in the mouth. With a central vowel following, [ɳ] is articulated neither too much forward in the mouth nor too much backward, as illustrated by palatogram 74. Palatograms 75, 76 and 77 are of the same three words again, reduced to life size. On the sectional diagram of the roof of the mouth that accompanies each of these palatograms the area of contact of the tongue during the consonant articulation is marked. Also marked in dashed lines is the position assumed by the main body of the tongue during the consonant articulation.

7.6.5.3 In palatograms 72 and 74 there is a suggestion of a wipe-off in the pre-palatal and post-alveolar zones. This is attributed to the fact that the tongue, after making contact with the hard palate for the articulation of [ɳ:], moves forward quickly, and in so doing, has removed some marking medium from these zones. (compare palatogram 27 of the word [ʈi:] (tea))

7.6.5.4 Palatograms 78 and 79 are of the word [a:ɳ] (male), illustrating the articulation of word-final [ɳ]. In palatogram 78 we see a very clear wipe-off in the palatal zone.

7.6.5.5 Intervocalic [ɳ] is a retroflex nasal flap. It is of a very short duration and palatograms 80 and 81 illustrate the retroflex nasal flap articulation. Palatogram 80 is of the word [maɳɪ] (bell) and palatogram 81 is of the word [maɳɨ] (a weight of measure). In both these we see that the tongue has removed some marking medium from zones 4 and 5 - the post-alveolar and pre-palatal zones. There is nothing in the palatograms to suggest that the tongue has made a firm contact with the roof of the mouth. The tip of the tongue is curled back and is then quickly flapped forward while the soft palate is lowered. The air escapes through the nose. The vocal cords vibrate, producing voice.

Distribution of [ɳ].

7.6.5.6 (a) [ɳ] does not occur at all in word-initial position.

7.6.5.7 (b) [ɳ] occurs intervocalically, when it is a retroflex nasal flap. For example,

[t̪ʻɑɳɪ] (cloth)

[mu:ɳɑ] (three)

Intervocalic [ɳ] is of very short duration. (see kymogram 141)

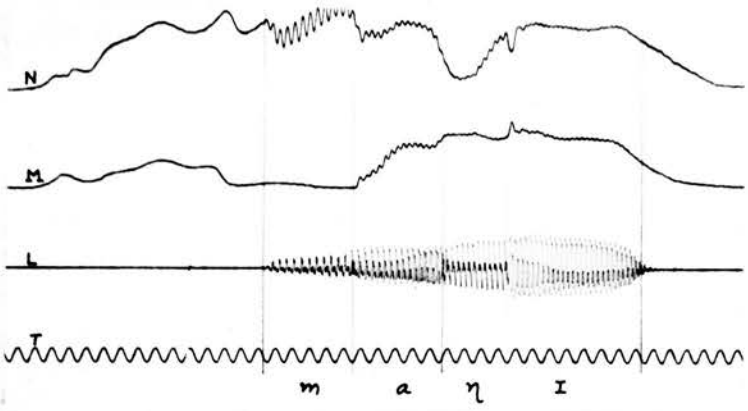
7.6.5.8 (c) [ɳ] occurs finally, as in

[kʻaɳ] (eye)

[maɳ] (mud)

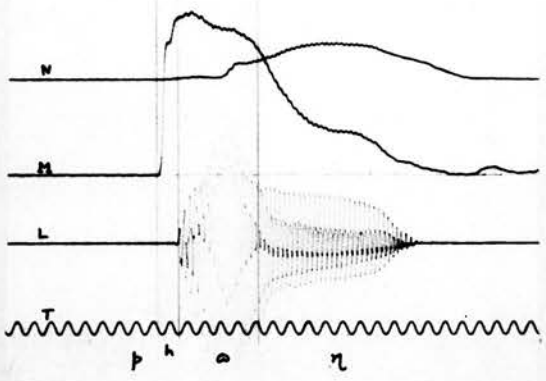
But these words are also pronounced [kʻaɳ:ɨ] and [maɳ:ɨ] respectively. Final [ɳ] is fully voiced. (see kymogram 142).

VOICED RETROFLEX NASALS [ɳ] AND [ɳ:]



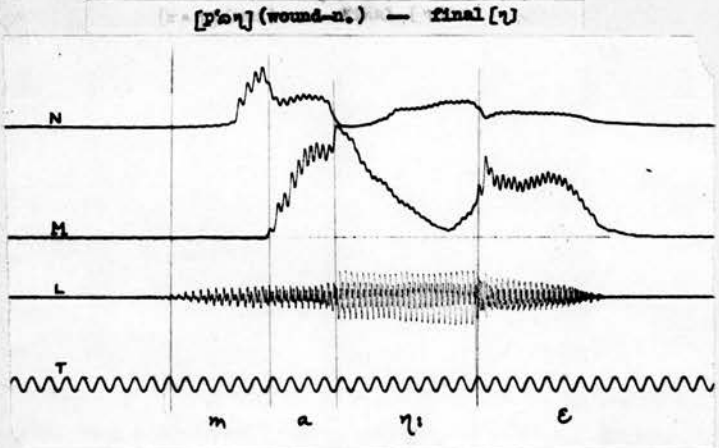
Kgm. 141

[maɳɪ] (bell) — intervocalic [ɳ]



Kgm. 142

[p'oɳ] (wound-n.) — final [ɳ]



Kgm. 143

[maɳ:ɛ] (mud-acc.) — intervocalic [ɳ:]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.6.5.9 (d) [ɳ] occurs in the medial consonant group [ʈɳ] as in

[tʃaʈɳɪ] (chutney)

[pʻaʈɳɪ] (starvation)

7.6.5.10 (e) [ɳ] occurs in the consonant group [ɳɖ] as in

[pʻuːɳɖo] (garlic)

[maɳɖɛ] (skull)

7.6.5.11 (f) [ɳː] - long, voiced retroflex occurs only intervocalically. The vowel preceding it is always short, as in

[ʋəɳːɛ] (butter)

[əɳːɛ] (oil)

Intervocalic [ɳː] is considerably longer than intervocalic [ɳ]. (see kymogram 143)

7.6.6 [ŋ] Voiced velar nasal:-

7.6.6.1 In articulating [ŋ] the 'back' of the tongue is raised and made to touch the soft palate, thus shutting off the oral passage of air completely. The soft palate is lowered and the air that is compressed by pressure from the lungs escapes through the nose. The vocal cords vibrate, producing voice.

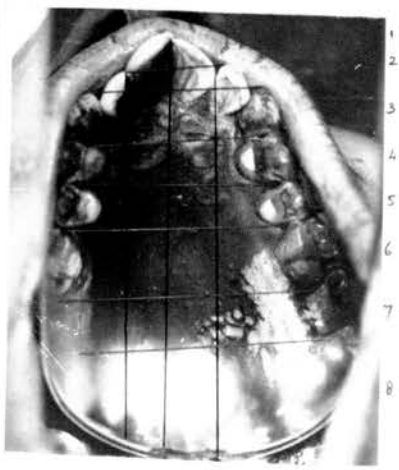
7.6.6.2 Since [ŋ] occurs only in the consonant group [ŋg] in the dialect of Tamil under survey, the

exact place of articulation for [ŋ] depends upon the place of articulation for [g] which, in turn, depends upon the vowel that follows it. This is illustrated with the help of word-palatograms. Palatograms 82, 83 and 84 are of the words [ɑŋgɪ] (a loose upper garment), [p'o:ŋgo:] (you - honorific - go) and [p'ɑŋgɨ] (share) respectively. In palatogram 82 of the word [ɑŋgɪ] there is a wipe-off in zone 7 - the post-palatal zone, which extends into the velar zone. The wipe-off in the velar zone is not complete. With a front vowel following, [ŋg] is articulated in the post-palatal zone. In palatogram 83 which illustrates the articulation of [ŋg] with the back vowel [o:] following it, the post-palatal zone is free from wipe-off except on the sides. The wipe-off starts in the middle of the velar zone, indicating that the articulation of [ŋg] in this example is further backward in the mouth. Palatogram 84 is of the word [p'ɑŋgɨ] (share), with the central vowel [ɨ] following [ŋg]. Here we see that the wipe-off is in the velar zone only. The post-palatal zone is left untouched by the tongue but, unlike in palatogram 83, the wipe-off in this case starts immediately at the end of the post-palatal zone. So, with a central vowel following, [ŋg] is articulated neither too much forward in the mouth, nor too much backward.

Articulation of [ŋg]

Pgm. 82
[aŋgɪ] (an upper garment)
[ŋg] followed by a front vowel

Pgm. 83
[pʻo:ŋgo:] (you-honorific-go)
[ŋg]followed by a back vowel

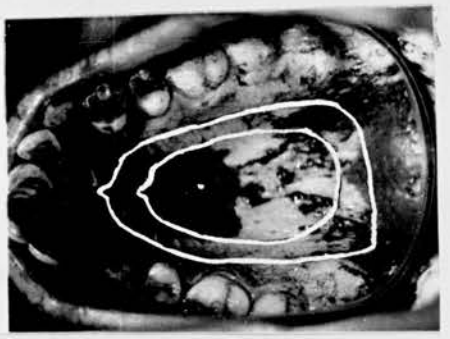


Pgm. 84
[pʻaŋgi] (share)
[ŋg] followed by a central vowel

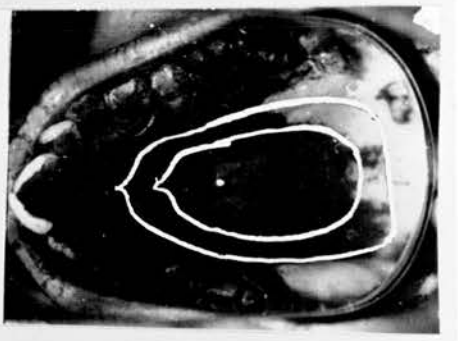
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

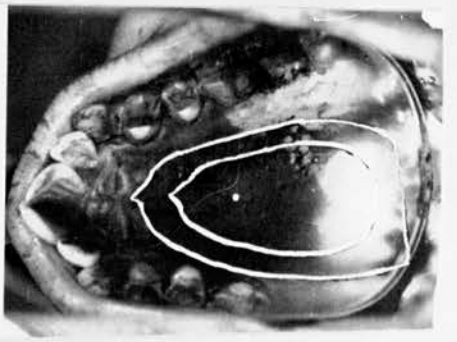
Articulation of [ŋg]



Pgm. 85
[aŋgɪ] (an upper garment)
[ŋg] followed by a front vowel



Pgm. 86
[pʻo:ŋgo:] (you-honorific-go)
[ŋg] followed by a back vowel



pgm. 87
[pʻaŋ gɨ] (share)
[ŋg] followed by a central vowel

7.6.6.3 Palatograms 85, 86 and 87 are of the same three words, reduced to life size. On the sectional diagram of the roof of the mouth that accompanies each of these palatograms, the area of contact of the tongue during the articulation of [ŋg] is marked. Also marked, in dashed lines, is the position assumed by the main body of the tongue during the consonant closure.

Distribution of [ŋ]:-

7.6.6.4 [ŋ] occurs only in the medial consonant group [ŋg]. For example:

[p'aŋgɨ]	(share)
[na:ŋgə]	(we)
[gaŋgɛ]	(the Ganges)
[maŋgal]	(dull)

7.7 THE LATERALS:-

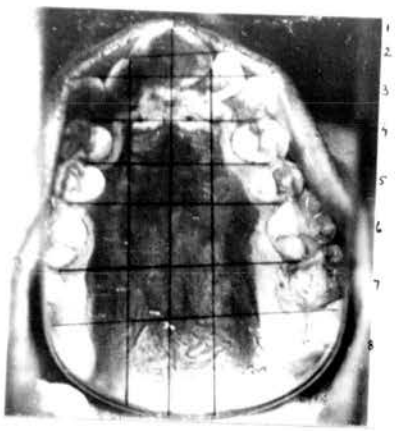
7.7.1 [l] Voiced alveolar lateral:-

7.7.1.1 The tip of the tongue is made to touch the alveolar ridge in such a way that though there is a complete closure in the middle of the oral cavity, there is enough gap on both sides of the tongue for the air that is compressed by pressure from the lungs to escape. The soft-palate is raised. The vocal cords vibrate, producing voice.

7.7.1.2 Several palatograms are reproduced in the next three pages. Palatograms 88, 89 and 90 are of the words [pʻɑl:ɪ] (lizard), [pʻɔl:ɔ] (grass) and [pʻɑl:ɨ] (tooth) respectively. These illustrate the articulation of [l] when it is followed by a front vowel, a back vowel and a central vowel. In palatograms 88 and 90 we see a wipe-off in the alveolar zone, which extends a bit into the post-alveolar zone. In palatogram 89, on the other hand, there is less of a wipe-off in the alveolar zone and more in the post-alveolar zone. These palatograms illustrate that with a back vowel following, [l] is articulated further backward in the mouth than when a front vowel or central vowel follows it.

7.7.1.3 Palatograms 91, 92 and 93 are life-size reproductions of the same three words. On the sectional diagram of the roof of the mouth that accompanies each of these palatograms, the area of

Articulation of [l:]



Pgm. 88
[p'ɑl:ɪ] (lizard)
[l:] followed by a front vowel

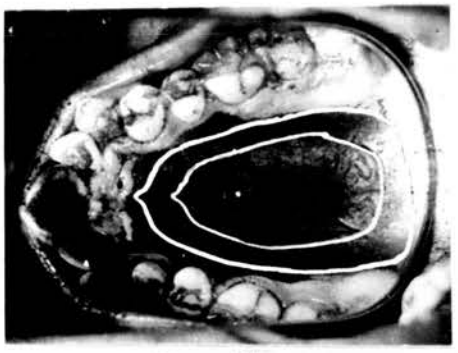
Pgm. 89
[p'ɑ l:ɑ] (grass)
[l:] followed by a back vowel

Pgm. 90
[p'ɑl:ɨ] (tooth)
[l:] followed by a central vowel

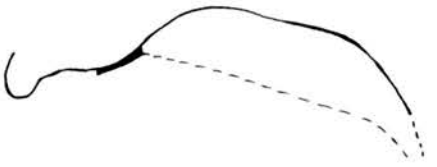
The Zones:

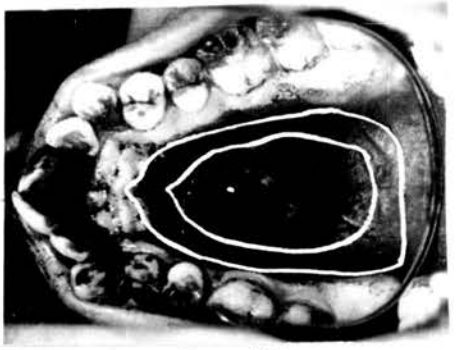
1. dental 2. dorti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

Articulation of [l:]

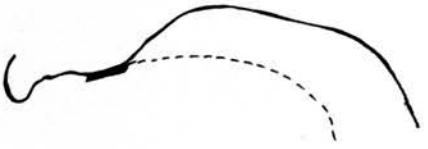


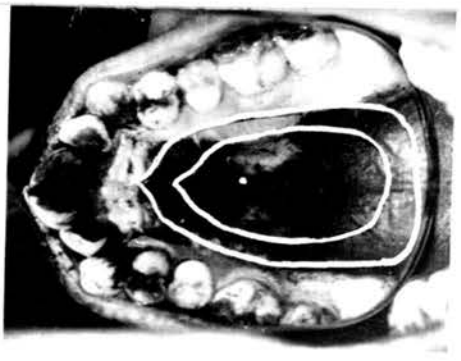
Pgm. 91
[p'a l:ɪ] (lizard)
[l:] followed by a front vowel





Pgm. 92
[p'ɷ l:ɷ] (grass)
[l:] followed by a back vowel



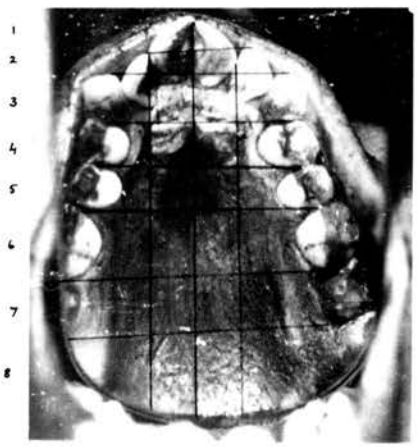


Pgm. 93
[p'a l:ɨ] (tooth)
[l:] followed by a central vowel

Articulation of [l]

Pgm. 94
[p'ɑlɪ] (tiger)
intervocalic [l]

Pgm. 95
[mɑ:lɛ] (garland)
intervocalic [l]



Pgm. 96
[p'ɑ:l] (milk)
final [l]

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

contact of the tongue for the articulation of [l] and the position assumed by the main body of the tongue during the articulation of [l] are marked, the latter in dashed lines.

7.7.1.4 The next two palatograms (palatograms 94 and 95) illustrate the articulation of intervocalic [l]. Intervocalic [l] is of very short duration and during its articulation the tip of the tongue hardly seems to make a firm contact with the alveolar ridge. Intervocalic [l] is more an alveolar lateral tap. Palatograms 94 and 95 are of the words [p'olɪ] (tiger) and [ma:lɛ] (garland) respectively. In both the palatograms there is a suggestion of a wipe-off in the latter half of the alveolar zone and the beginning of the post-alveolar zone. However, as the wipe-off is not clear, we cannot say that the tip of the tongue has made any firm contact with the teeth ridge. Rather, the tip of the tongue seems to have touched the teeth-ridge very lightly and then flapped forward quickly. When the tip of the tongue touches the teeth ridge before flapping forward, the air escapes through the sides of the tongue, producing the alveolar lateral tap [l]. The difference in wipe-off is very clear if we compare these two palatograms with palatograms 88, 89 and 90, which illustrate the articulation of intervocalic [l:]. We see in those palatograms a clearer and broader wipe-off, suggesting a firmer

contact made by the tip of the tongue with the teeth-ridge. (Also compare the wipe-offs in palatograms 58-59 and 60-61 which illustrage the articulation of intervocalic [n] and [n:] respectively).

7.7.1.5 Palatogram 96 is of the word [p'ɑ:l] with a word-final [l]. The wipe-off is in the alveolar zone, extending a bit into the post-alveolar zone. In this palatogram too, we see a clearer wipe-off than in the previous two.

Distribution of [l]:-

7.7.1.6 (a) [l] occurs initially as in [lɑ:ɽÃ] (horseshoe), [lɑ:βÃ] (profit), [lɑɲdʒÃ] (bribery). Initial [l] is fully voiced. (see kymogram 144)

7.7.1.7 (b) [l] occurs in medial consonant groups as in

[ɑlpÃ] (petty-minded person)

[p'ɑ:lkɑ:ɾÃ] (milkman)

7.7.1.8 (c) [l] occurs intervocalically. In this position [l] is an alveolar lateral tap. A few examples are:

[jɛlɪ] (rat)

[p'ɷlɪ] (tiger)

[mɑlɛ] (mountain)

[mɑ:lɛ] (garland)

Intervocalic [l] is very short. (see kymogram 146).

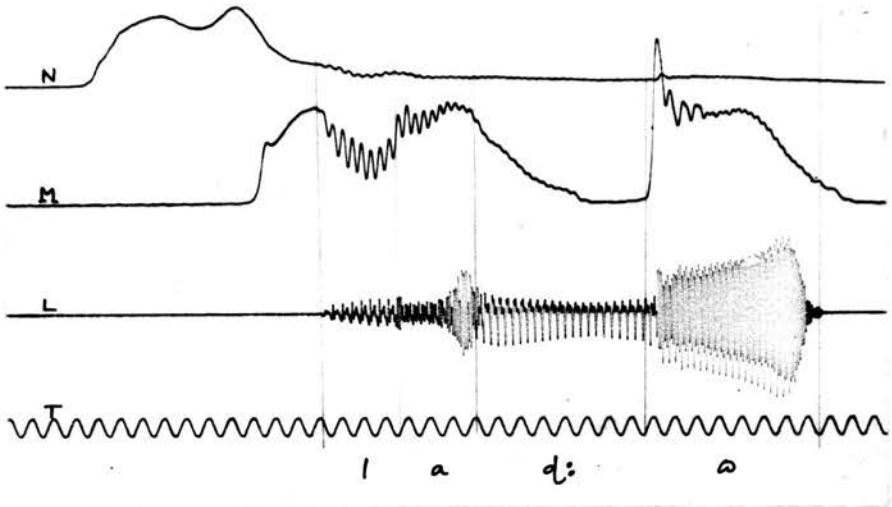
7.7.1.9 (d) [l] occurs finally as in [kʻɑl] (stone), [kʻɑ:l] (leg). But it should be mentioned that Tamil speakers add a vowel to the final [l] while pronouncing words such as the ones given above. Also, they lengthen the [l] if the vowel preceding it is short. Thus [kʻɑl] (stone) is also pronounced [kʻɑl:ɨ] and [kʻɑ:l] (leg) is also pronounced [kʻɑ:lɨ]. It should also be added that no vowel is added to the final [l] in words having more than one syllable. Thus, while [kʻɑ:l] (leg) may also be pronounced [kʻɑ:lɨ], the word [kʻɑp:ɑl] (ship) is never pronounced [kʻɑp:ɑlɨ]. Final [l], when it occurs in speech, is fully voiced. (see kymogram 145).

7.7.1.10 (e) [l:] - long, voiced alveolar lateral - occurs only intervocalically. The vowel preceding it is always short, e.g.,

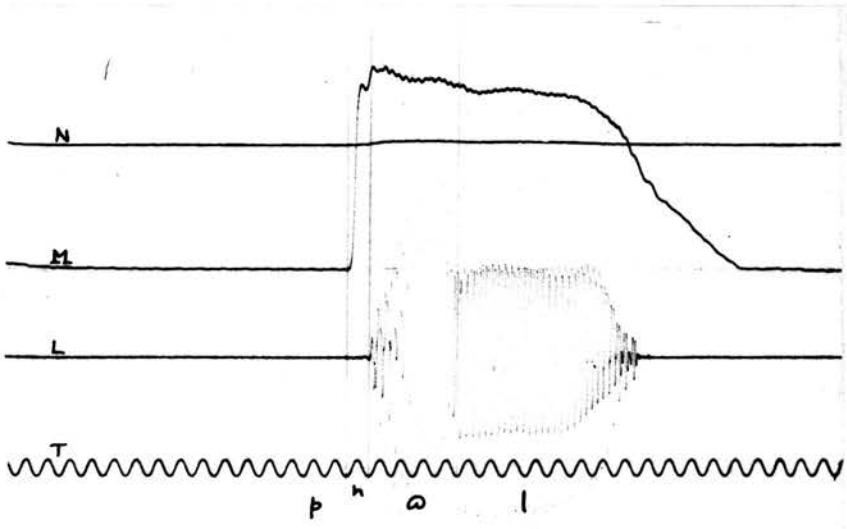
[t̪ʻol:ɛ] (trouble), [nɑl:ə] (good).

Intervocalic [l:] is considerably longer than intervocalic [l]. (Compare kymograms 146 and 147).

VOICED ALVEOLAR LATERAL [l]



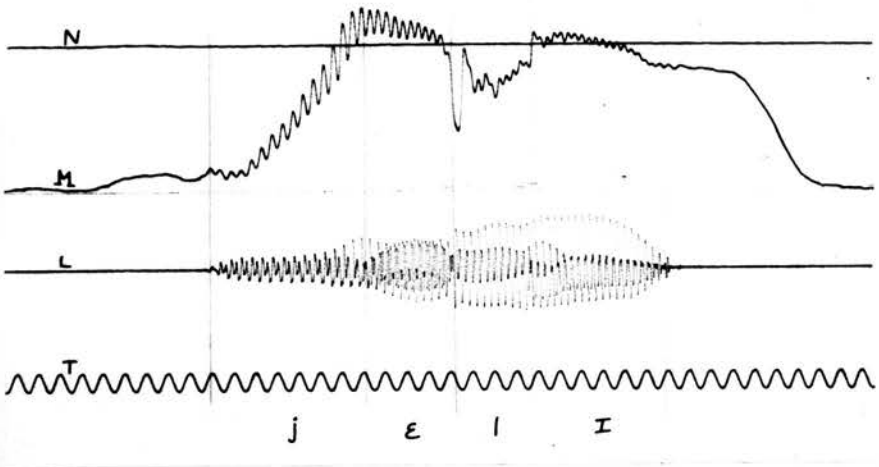
Kgm. 144
[laɖ:ɑ] (a sweetmeat) — initial [l]



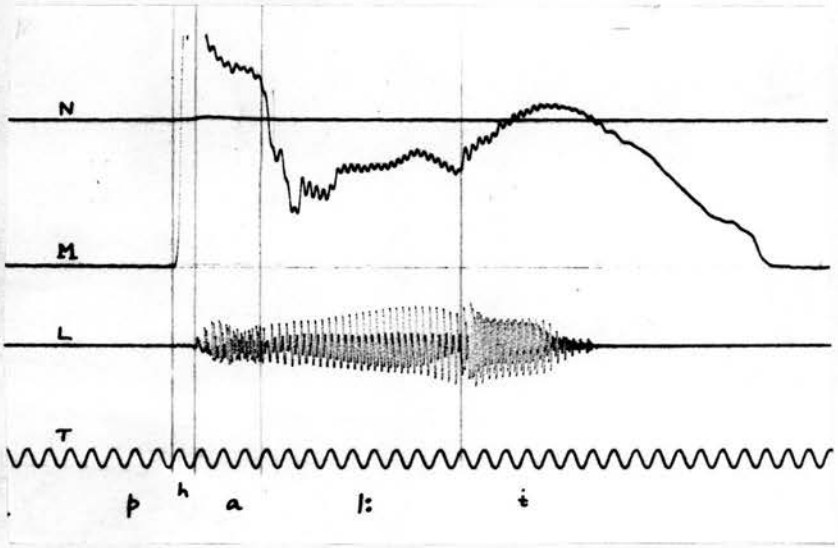
Kgm. 145
[pʻɑl] (grass) Final [l]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

VOICED ALVEOLAR LATERALS [l] AND [l:]



Kgm. 146
[jɛlɪ](rat) — intervocalic [l]



Kgm. 147
[p'alːi] (tooth) — intervocalic [l:]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

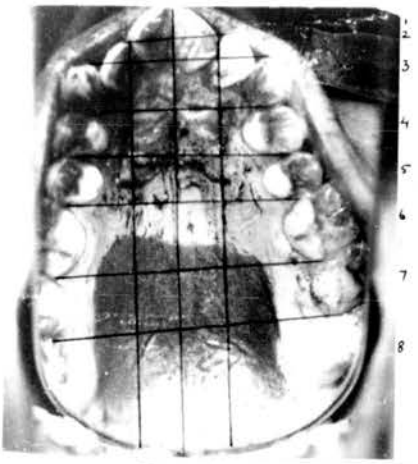
7.7.2 [ɭ] Voiced retroflex lateral.

7.7.2.1 In articulating [ɭ] the tip of the tongue is curled back and made to touch the hard palate in such a way that though there is a complete closure in the middle of the palatal region, there is enough gap on the sides. The air that is compressed by pressure from the lungs escapes through these sides. The vocal cords vibrate, producing voice.

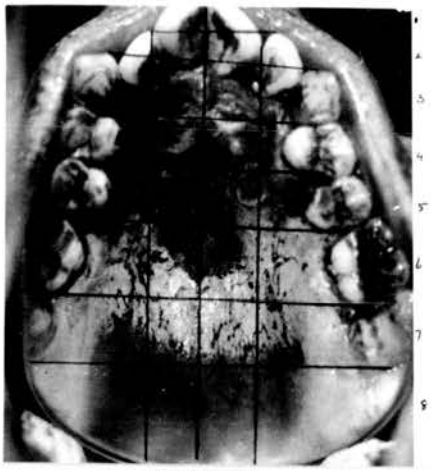
7.7.2.2 Three palatograms are reproduced on the next page. Palatograms 97, 98 and 99 are of the words [pʻɷɭːɪ] (dot), [mɷɭːɷ] (thorn) and [ɑɭːɨ] (gather - imp.) respectively. These words were chosen for a palatographic investigation of the retroflex lateral because [ɭ] does not occur initially in a word and intervocalic [ɭ] is a retroflex lateral flap.

7.7.2.3 Palatogram 97 is of the word [pʻɷɭːɪ] (dot), which illustrates the articulation of [ɭː] when a front vowel follows it. Here we find a wipe-off in the second half of zone 5 and the first half of zone 6 - the pre-palatal and palatal zones. In palatogram 98 ([mɷɭːɷ] (thorn)) the pre-palatal zone and even a great part of the palatal zone are free from wipe-off. The wipe-off starts at the end of the palatal zone and extends to the greater part of the post-palatal zone, illustrating a much backward articulation of [ɭː] when a back vowel follows it. Palatogram 99 is of the word [ɑɭːɨ] (gather - imp.)

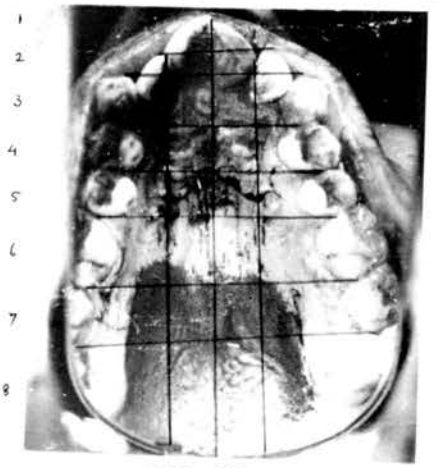
Articulation of [ɭ:]



Pgm. 97
[pʻɷɭ:ɪ] (dot)
[ɭ:] followed by a front vowel



Pgm. 98
[mɷɭ:ɷ] (thorn)
[ɭ:] followed by a back vowel

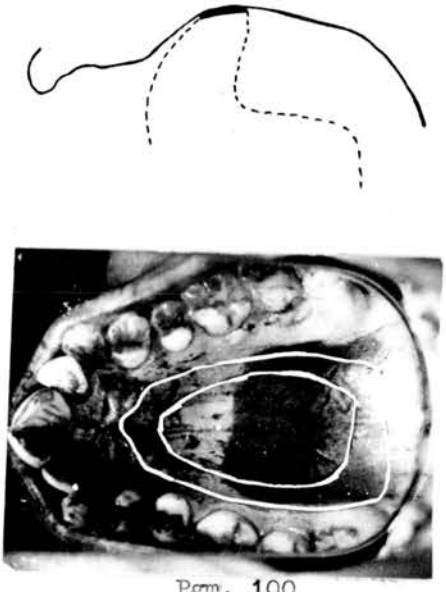


Pgm. 99
[aɭ:ɨ] (gather-imp.)
[ɭ:] followed by a central vowel

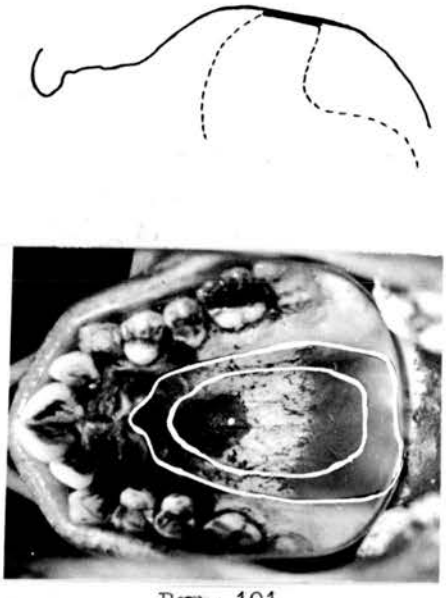
The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

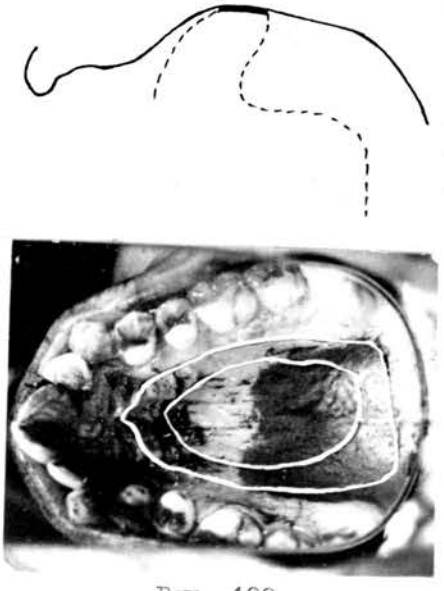
Articulation of [ɭ:]



Pgm. 100
[p'ɔɭ:ɪ] (dot)
[ɭ:] followed by a
front vowel

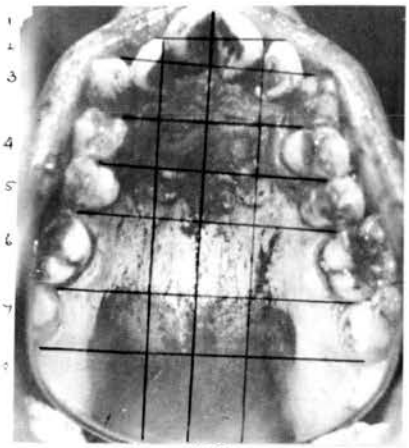


Pgm. 101
[mɔɭ:ɔ] (thorn)
[ɭ:] followed by a
back vowel



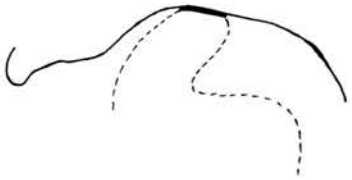
Pgm. 102
[aɭ:i] (gather-imp.)
[ɭ:] followed by a
central vowel

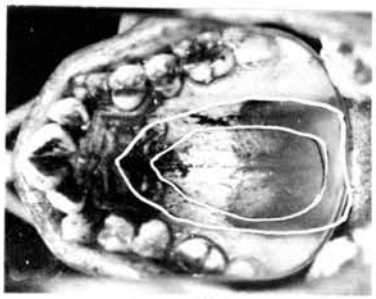
Articulation of [ʃ]



Pgm. 105
[mɑ̈ʃ] (thorn)
Final [ʃ]

Pgm. 103
[ɑ̈ʃɪ] (chisel)
intervocalic [ʃ]





Pgm. 106
[mɑ̈ʃ] (thorn)
Final [ʃ]

Pgm. 104
[ɑːʃ] (man)
intervocalic [ʃ]

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

with a central vowel following [ɭ:]. Here the wipe-off is in zone 6 - the palatal zone. The pre-palatal and the post-palatal zones are free from wipe-off, illustrating that the articulation of [ɭ:] with a central vowel following it is neither too much forward (as when a front vowel follows it) in the mouth nor too much backward (as when a back vowel follows it).

7.7.2.4 Palatograms 100, 101 and 102 are of the same three words, reduced to life-size. Each of these is accompanied by a sectional diagram of the roof of the mouth. The area of contact of the tongue during the articulation of [ɭ:] is marked on the sectional diagram. The position assumed by the main body of the tongue is also marked in dashed lines.

7.7.2.5 Intervocalic [ɭ] is a retroflex lateral flap. The tongue is curled back but it does not make a firm contact with the hard palate. It touches the hard palate lightly and then flaps forward quickly. When the tip of the tongue touches the hard palate lightly, the air escapes through the sides of the tongue.

7.7.2.6 Palatograms 103 and 104 illustrate the articulation of the retroflex lateral flap. Palatogram 103 is of the word [ɑɭɪ] (chisel) and palatogram 104 is of the word [ɑ:ɭɨ] (man). In both these palatograms there is a suggestion of a wipe-off in the post-alveolar and pre-palatal zones.

When the tip of the tongue is flapped forward, it removes some marking medium from these zones. (compare palatograms 80 and 81, which illustrate the articulation of the retroflex nasal flap).

7.7.2.7 Palatograms 105 and 106 illustrate the articulation of word-final [ɻ]. In palatogram 105 which has been divided into zones, we see a very clear wipe-off in zone 6 - the palatal zone.

Distribution of [ɻ]

7.7.2.8 (a) [ɻ] does not occur initially in a word.

7.7.2.9 (b) [ɻ] occurs medially in words, as in [pʻɪʈɻɛ] (a type of curry).

7.7.2.10 (c) [ɻ] occurs intervocalically, as in [pʻoɻɪ] (tamarind), [kʻəɻɛ] (branch of a tree). Intervocalic [ɻ] is very short. (compare kymograms 148 and 149).

7.7.2.11 (d) [ɻ] occurs finally as in [kʻaɻ] (toddy), [t̪ʻəːɻ] (scorpion). But while pronouncing monosyllabic words with a final [ɻ], Tamil speakers usually add a vowel to the [ɻ]. While doing so, they lengthen the [ɻ] if the preceding vowel is short. There is no such lengthening if the vowel preceding [ɻ] is long. Thus [kʻaɻ] (toddy) may be pronounced [kʻaɻ] or [kʻaɻːɨ] and [t̪ʻəːɻ] (scorpion) may be pronounced [t̪ʻəːɻ] or [t̪ʻəːɻɨ]. However, while pronouncing words of more than one syllable with a final [ɻ], no extra vowel is added to the

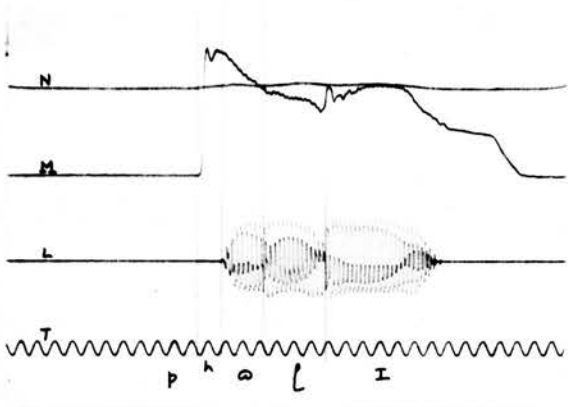
final [ɭ]. Thus [mɑɲdʒɑɭ] (yellow) is never pronounced [mɑɲdʒɑɭɨ]. Word-final [ɭ] is fully voiced. (see kymogram 150).

7.7.2.12 (e) [ɭ:] - long, voiced retroflex lateral - occurs only intervocalically. The vowel preceding it is always short. A few examples are:

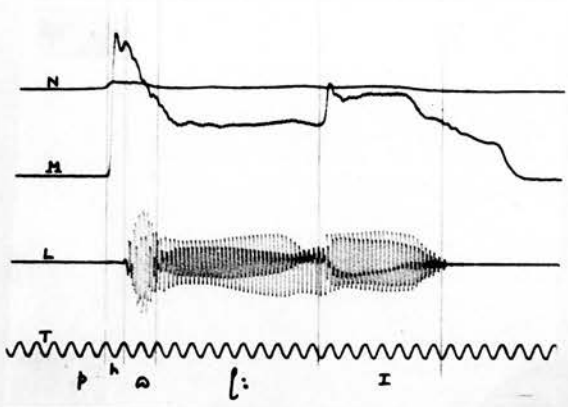
[pʻɷɭ:ɪ]	(dot)
[ʋ ɘɭ:ɐ̃]	(flood)
[ʈʻɑɭ:ɨ]	(push - imp.)
[moɭ:ɘ]	(slowly)

Intervocalic [ɭ:] is considerably longer than intervocalic [ɭ]. (compare kymograms 148 and 149).

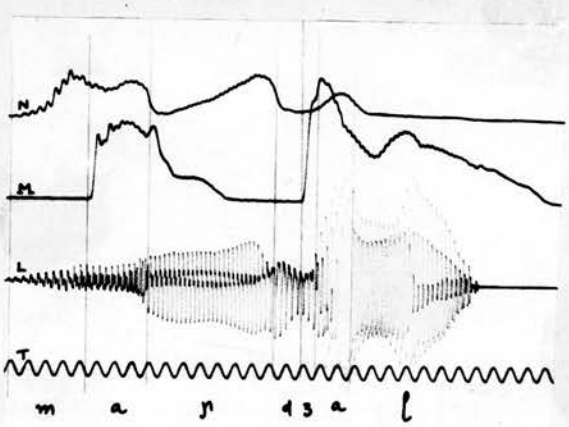
VOICED RETROFLEX LATERAL



Kgm. 148
[p'ɑ[ɪ] (tamarind) — intervocalic [[]



Kgm. 149
[p'ɑ[ɪ](dot) — intervocalic [[ː]



Kgm. 150
[maɲʤɑ[] (yellow) — final [[]

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.8 THE FRICATIVES:-

7.8.1 [β] Voiced bilabial fricative

7.8.1.1 The two lips are brought together so that the space between them is very narrow. The air that is compressed by pressure from the lungs escapes through this narrow space between the lips, causing audible friction. The soft palate is raised and the vocal cords vibrate, producing voice.

Distribution:-

7.8.1.2 [β] occurs only intervocalically as in

[ɑ:βɑt̪:ɨ] (danger)

[kʻɑβəɽɨ] (deceit)

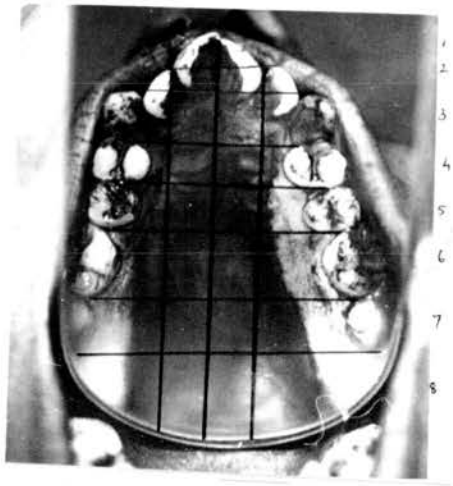
[ʋɪβɑt̪ʻɨ] (accident)

7.8.2 [ð] Voiced dental fricative:-

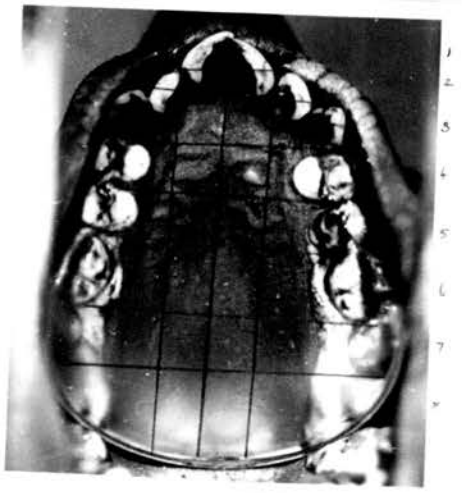
7.8.2.1 The tip and blade of the tongue are brought very close to the upper front teeth so that the space between them is very narrow. The air that is compressed by pressure from the lungs escapes through this narrow space, causing audible friction. The soft palate is raised and the vocal cords vibrate, producing voice.

7.8.2.2 Two palatograms are reproduced on the following page. Palatogram 107 is of the word [pʻɑ:ðɪ] (half) and palatogram 108 is of the word [pʻoðɷ] (common). In both the palatograms the marking medium in the middle of the palate is left untouched. (The lateral

Articulation of [ɤ]



Pgm. 107
[p'ɑ:ɤɪ] (half)



Pgm. 108
[p'oɤə] (common)

The Zones:

1. dental 2. denti-alveolar
3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal
7. post-palatal 8. velar

wipe-off in palatogram 107 is attributed to the articulation of the front vowel [ɪ]). The edges of the frontal and lateral incisors are white in both the palatograms. This illustrates that the tip/blade of the tongue removes some marking medium from the edges of the frontal and lateral incisors during the articulation of [ð].

Distribution of [ð]:-

7.8.2.3 [ð] occurs only intervocalically, as in

[kʻa:ðɨ] (ear)

[aðɨ] (it)

[kʻaðəʋɨ] (door)

[pʻa:ðɪ] (half)

7.8.3 [s] Voiceless blade alveolar fricative:-

7.8.3.1 The tip and blade of the tongue are brought very close to the teeth ridge so that the space between them is very narrow. The air that is compressed by pressure from the lungs escapes through this narrow space, causing audible friction. The soft palate is raised. The vocal cords do not vibrate during the articulation of [s].

Distribution of [s]:-

7.8.3.2 In the dialect of Tamil under survey [s] does not occur very frequently.

(a) [s] occurs initially in a few words.

For example,

[sa:mba:ɾ] (a kind of soup)

[sa:mɪ] (God)

[so:p°o] (soap)

[su:ɾɪjÃ̃] (sun)

7.8.3.3 (b) [s] occurs intervocalically in a few words. e.g.,

[rasÃ̃] (pepperwater)

[p'a:jasÃ̃] (pudding)

7.8.3.4 (c) [s] occurs finally in a number of loan words that occur very freely in speech. But while pronouncing monosyllabic words with a final [s], Tamil speakers add a vowel to the final [s]. Also, the [s] is lengthened if the vowel preceding is short. Thus the word <u>bus</u> is pronounced either [bas] or [bas:ɨ], but the word <u>pass</u> is pronounced either [p'a:s] or [p'a:sɨ]. However, final [s] in disyllabic and polysyllabic words is pronounced without any additional vowel. e.g.,

[sarkas] (circus)

[ha:ɾlɪks] (horlicks)

7.8.4 <u>[ʂ] Voiceless retroflex fricative:-</u>

7.8.4.1 The tip of the tongue is curled back and it is brought very near the hard palate so that the space between them is very narrow. The air that is compressed by pressure from the lungs escapes through this narrow space, causing audible friction. The

soft palate is raised and the vocal cords do not vibrate during the articulation of [ʂ].

7.8.4.2 Palatograms of the word [ʂɑ:p'i] (shop) are reproduced on the next page (palatogram 109). In this palatogram we see that there is a wipe-off on the sides of zone 6 - the palatal zone. The middle of the palatal zone is free from wipe-off. When the tip of the tongue is curled up and brought near the hard palate, the sides of the tongue seem to have removed some marking medium from the sides of the palatal zone.

7.8.4.3 Palatogram 110 is of the same word. This palatogram, accompanied by a sectional diagram of the roof of the mouth, is reduced to life-size. The position assumed by the tongue during the articulation of [ʂ] is marked on the sectional diagram.

Distribution of [ʂ]:-

7.8.4.4 (a) [ʂ] occurs initially in a few words like [ʂɑ:p'i] (shop).

7.8.4.5 (b) [ʂ] occurs in initial and medial consonant clusters like

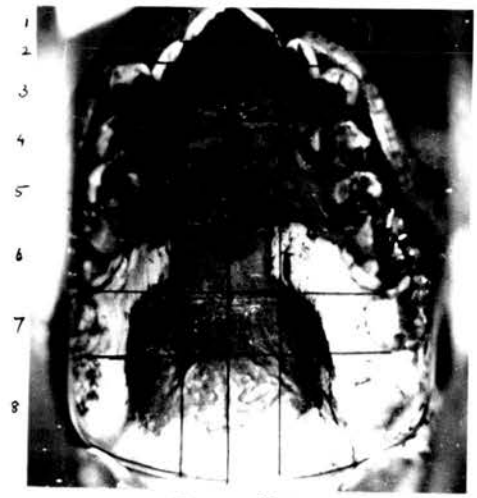
[kʂe:mÃ] (well-being)

[nɑkʂɑt̪ɾÃ] (star)

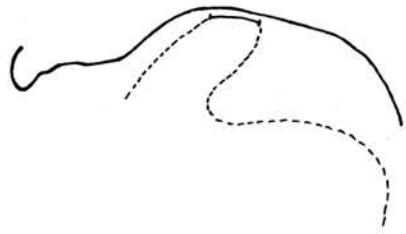
[lɑkʂÃ] (a hundred thousand)

7.8.4.6 (c) [ʂ] occurs intervocalically, as in [k'ɷʂɪ] (jollity), [ʋəʂÃ] (poison), [k'ɑʂɑ:jÃ] (decoction).

Articulation of [ʂ]



Pgm. 109
[ʂɑ:p•ɨ] (shop)



The Zones:

1. dental 2. denti-alveolar
3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal
7. post-palatal 8. velar

Pgm. 110
[ʂɑ:p•ɨ] (shop)

7.8.4.7 (d) [ʂ] occurs in the medial consonant group [ʂt] as in [kʻɑʂtÃ] (difficulty) and [nɑʂtÃ] (loss).

7.8.4.8 (e) [ʂ] does not occur finally in a word.

7.8.5 [ʐ] Voiced retroflex fricative:-

7.8.5.1 [ʐ] is articulated exactly like [ʂ] described in 7.8.4.1 above, except that during the articulation of [ʐ], the vocal cords vibrate, producing voice.

7.8.5.2 Distribution:- In the dialect of Tamil under survey [ʐ] as a fricative occurs only as a free variant of [ɻ] as an approximant. The more commonly used sound is [ɻ] as an approximant. The fricative [ʐ] is used only when a word has to be emphasized. The distributional possibilities of [ɻ] are discussed in the section on approximants. (see 7.10.2.3).

7.8.6 [ɕ] Voiceless alveolo-palatal fricative:-

7.8.6.1 In articulating [ɕ], the blade of the tongue is brought very near the palatal region, immediately behind the teeth ridge. The tip of the tongue plays no part in articulating [ɕ]. The space between the blade of the tongue and the alveolo-palatal region is very narrow. The air that is compressed by pressure from the lungs escapes through this narrow passage, causing audible friction. The

soft palate is raised and the vocal cords do not vibrate.

7.8.6.2 Four palatograms are reproduced on the following page, illustrating the articulation of [ɸ]. Palatograms 111-114 are of the words [ɸi:p'i] (comb - n.), [wo:ɸɛ] (sound), [p'aɸɪ] (hunger) and [p'aɸɛ] (glue - n.) respectively. In all these palatograms, there is a wipe-off on the sides of zones 3 and 4 - the alveolar and the post-alveolar zones. The sides of the tongue have removed some marking medium from the sides of the alveolar and post-alveolar regions while the air escapes through the middle where the marking medium is intact.

Distribution of [ɸ]:-

7.8.6.3 (a) [ɸ] occurs very freely in word-initial position. A few examples are:-

[ɸi:p'i]	(comb - n.)
[ɸaɳɖɛ]	(fight - n.)
[ɸandi]	(lane)
[ɸop:o]	(toy)

7.8.6.4 (b) [ɸ] occurs intervocalically, as in

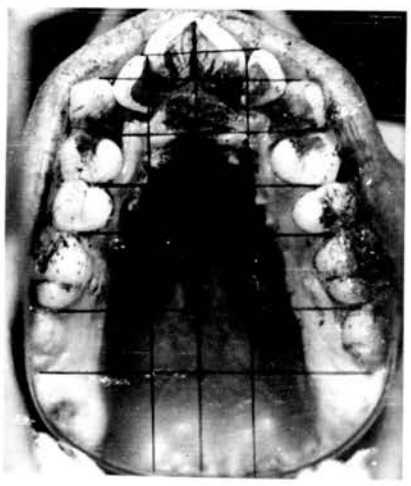
[p'aɸɪ]	(hunger)
[p'aɸɛ]	(glue - n.)
[k'oɸo]	(mosquito)
[k'a:ɸi]	(money)

7.8.6.5 (c) [ɸ] does not occur finally.

Articulation of [ɸ]

Pgm. 111
[ɸi:pʰi] (comb-n.)

Pgm. 112
[wo:ɸɛ] (sound)



Pgm. 113
[pʼaɸɪ] (hunger)

Pgm. 114
[pʼaɸɛ] (glue-n.)

The Zones:

1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

7.8.7 [h] Voiceless glottal fricative:-

7.8.7.1 The mouth is held in a vowel position and the air escapes through the glottis which is wide open, causing audible friction. The soft palate is raised.

Distribution:-

7.8.7.2 (a) [h] occurs initially in a word. A few examples are:-

[hɑ:ɾÃ]	(garland)
[ho:mÃ]	(a religious ceremony)
[hi:ɾo:]	(hero)
[hɑ:ɾlɪks]	(horlicks)

(b) [h] does not occur in any other position.

7.8.8 [ɦ] Voiced glottal fricative:-

7.8.8.1 [ɦ] is articulated exactly like [h] described above, except that in the articulation of [ɦ] the air is emitted through the glottis with such exhaling force that the vocal cords vibrate, producing voice.

Distribution:-

7.8.8.2 (a) [ɦ] occurs only intervocalically. The vowel preceding it is anything other than [i:] and [ɪ]. e.g.,

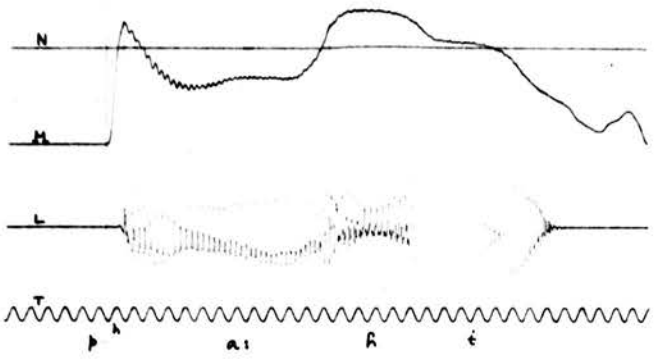
[nɑɦɛ]	(jewels)
[p'oɦɛ]	(smoke)
[moʐoɦo]	(mop - imp.)
[ɑʐəɦɨ]	(beauty)

(see kymograms 151, 152 and 153)

7.8.8.3 (b) [ɦ] is palatalized if it is immediately followed by [ɪ]. e.g., [ɑʐəɦɪ] (beautiful girl)

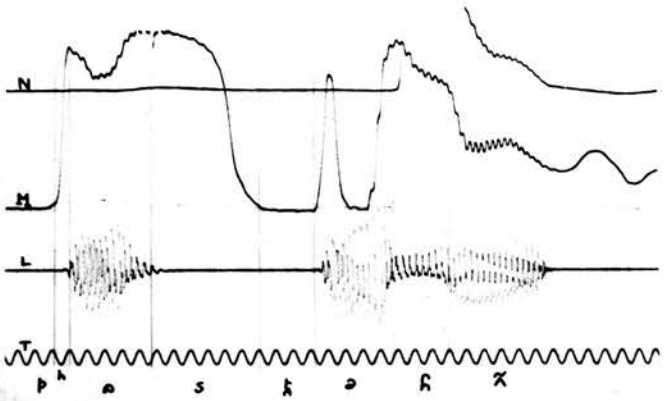
[ɑʐɨɦɪ] (having become rotten)

VOICED GLOTTAL FRICATIVE [ɦ]



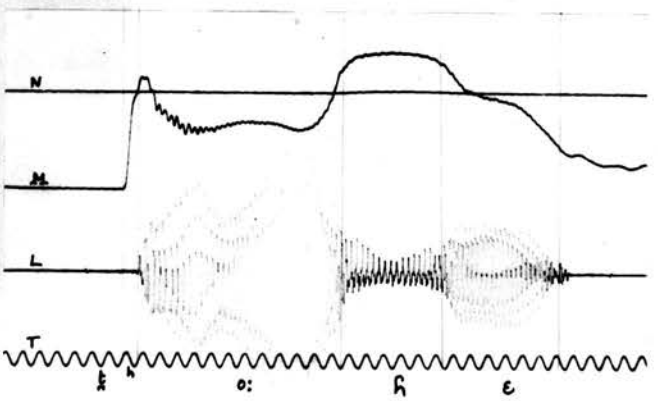
Kgm. 151

[pʻaːɲɦa] (caramel) — intervocalic [ɦ]



Kgm. 152

[pʻɑstɔhχ] (book) — intervocalic [ɦ]



Kgm. 153

[ʈʻoːɲɛ] (peacock feathers) — intervocalic [ɦ]

N-Nose cut M-Mouth cut L-Larynx T-Time (50 cps)

7.9 TRILLS AND FLAPS

7.9.1 [r] Voiced alveolar trill:-

7.9.1.1 The tip of the tongue is made to vibrate several times successively on the alveolar ridge. The soft-palate is raised and the vocal cords vibrate, producing voice.

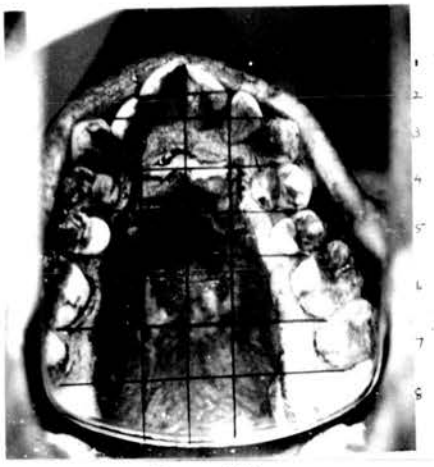
7.9.2 [ɾ] Voiced alveolar tap:-

7.9.2.1 The tip of the tongue taps against the alveolar ridge just once and then flaps forward quickly. The soft-palate is raised. The vocal cords vibrate, producing voice.

7.9.2.2 Four palatograms are reproduced on the next page. Palatogram 115 and 116 are of the words [rambÃ] (saw-n.) and [ra:ɦÃ] (a tune) respectively. In both these palatograms we see a tiny wipe-off starting at the end of the alveolar zone, extending to a bit of the post-alveolar zone. Palatograms 117 and 118 are of the words [aɾɛ] (written aṟai, meaning "half") and [aɾɛ] (written aṟai, meaning "a blow with the hand") respectively.[11] In both the palatograms we see that there is a suggestion of a wipe-off in the alveolar and post-alveolar zones but the wipe off in these two palatograms is less and less clear than in the previous two palatograms. These two palatograms illustrate the articulation of [ɾ]. The

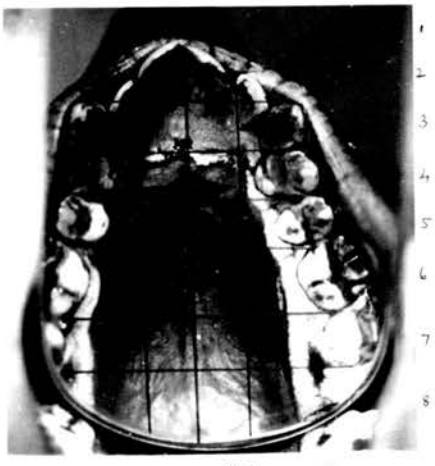
11. There are two orthographic symbols to represent [ɾ] and [r] in Tamil, but there is no one-to-one correspondence between the two symbols and the two sounds. For a fuller discussion of this, see chapter II, 2.4.11 and 2.4.12.

Articulation of [ɾ] and [r]



Pgm. 115
[rambɾ̃] (saw-n.)

Pgm. 116
[ra:hɾ̃] (a tune)



Pgm. 117
[aɾɛ] (half)

Pgm. 118
[aɾɛ] (a blow with the hand)

The Zones:
1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

tip of the tongue seems to have just managed to take away a bit of the marking medium while tapping the alveolar ridge once. In palatograms 115 and 116 which illustrate the articulation of [r] we see a clearer wipe off. This is because the tip of the tongue taps against the alveolar ridge several times and thus removes more marking medium.

Distribution of [r].

7.9.2.3 (a) [r] occurs initially. e.g.,

[raṯ:ɑ̃] (blood)

[ra:dʒa:] (king)

[ra:ɳɪ] (queen)

[ra:ʈʂɪ] (night)

7.9.2.4 (b) [r] may occur in initial consonant clusters such as

[pra:ɳɪ] (living being)

[gra:mɑ̃] (village)

[kra:mbɨ] (cloves)

[bra:ɳɖɪ] (brandy)[12]

7.9.2.5 (c) [r] may occur intervocalically. e.g.,[13]

[ɷrɪ] (peel - imp.)

[kʻarɪ] (curry)

[marɑ̃] (tree)

[pʻe:rɨ] (name)

7.9.2.6 (d) [r] may occur finally as in[14]

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12. In all these words [ɾ] and [r] occur as free variants as the second element of the initial consonant cluster. The occurrence of [ɾ] however, is more common.

13.14. In intervocalic and final positions, [r] and [ɾ] are free variants. In intervocalic position, the occurrence of [ɾ] is more common than the occurrence of [r].

[ɑʋar] (he - honorific)

[t̪ʻa:r] (tar)

Distribution of [ɾ]:-

7.9.2.7 (a) [ɾ] does not occur initially.

7.9.2.8 (b) [ɾ] occurs intervocalically. (see footnote 13 above) e.g.,

[ɑɾɪ] (peel - imp.)

[kʻaɾɪ] (curry)

[maɾÃ] (tree)

[pʻe:ɾɨ] (name)

7.9.2.9 (c) [ɾ] occurs as the second element of an initial consonant cluster. (see footnote 12 above) as in

[kɾa:mbɨ] (cloves)

[gɾa:mÃ] (village)

7.9.2.10 (d) [ɾ] occurs finally (see footnote 14 above) as in

[ɑʋaɾ] (he - honorific)

[t̪ʻa:ɾ] (tar)

[mo:ɾ] (buttermilk)

[kʻe:pʻəɾ] (he - honorific - will ask)

Monosyllabic words with a final [r] may be pronounced with an epenthetic vowel at the end. Thus the two words [t̪ʻa:ɾ] (tar) and [mo:ɾ] (buttermilk) may also be pronounced [t̪ʻa:ɾɨ] and [mo:ɾo] respectively.

7.9.2.11 A few kymograms are reproduced in the next few pages to illustrate the occurrence of [r] and [ɾ]. Kymograms 154 and 155 are of the words [rambÃ] (saw-n.) and [ra:ɦÃ] (a tune) respectively. The mouth tracing corresponding to the segment [r] shows a few dips in

the air-flow, with each dip followed by a rise. That there is a succession of dips and rises illustrates the point that the initial segment in these two words is a trilled [r]. Kymograms 156 to 161 are of the words [aɾɛ] (half), [aɾɛ] (a blow with the hand), [k'aɾɪ] (charcoal), [k'aɾɪ] (curry), [p'aɾɨp·ɨ] (lentils) and [k'aɾɨp·ɨ] (black) respectively. In writing down the words meaning "a blow with the hand", "curry" and "black" the orthographic symbol ற (which we transliterate r), while to write down the other three words the symbol ர (which we transliterate ɾ) are used.[15] In pronouncing all these words in normal speech [ɾ] is used as illustrated by the kymograms of these six words. In all these six kymograms we see just one dip along the mouth tracing indicating a sudden arrest of the air-flow through the mouth. This single dip indicates a one-tap [ɾ].

7.9.2.12 Kymogram 162 is of the word [arɛ] (half). This

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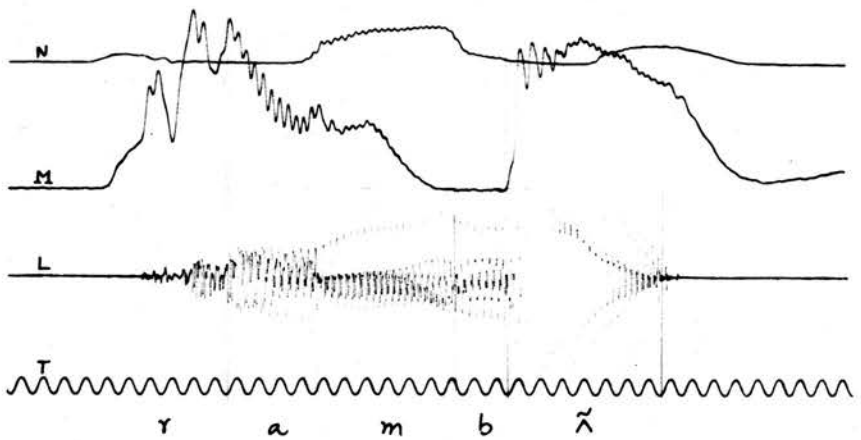
15. The present writer has chosen to transliterate the Tamil orthographic symbol ர with the I.P.A. symbol ɾ and the Tamil orthographic symbol ற with the I.P.A. symbol r for the following reasons:
    (a) The Tamil orthography has two symbols and hence it was thought that this distinction should be made.
    (b) ர (ɾ) and ற (r) are commonly called "the small r" and "the big r" respectively by many an elder while teaching the orthography to children and while correcting their spelling mistakes.
    (c) If one of an orthographic minimal pair is misunderstood, say, for example, if the listener misunderstands the word kari [k'aɾɪ] (curry) to mean kari [k'aɾɪ] (charcoal), the speaker then trills the r. It is invariably the symbol ற (which we transliterate r) which he chooses to trill.

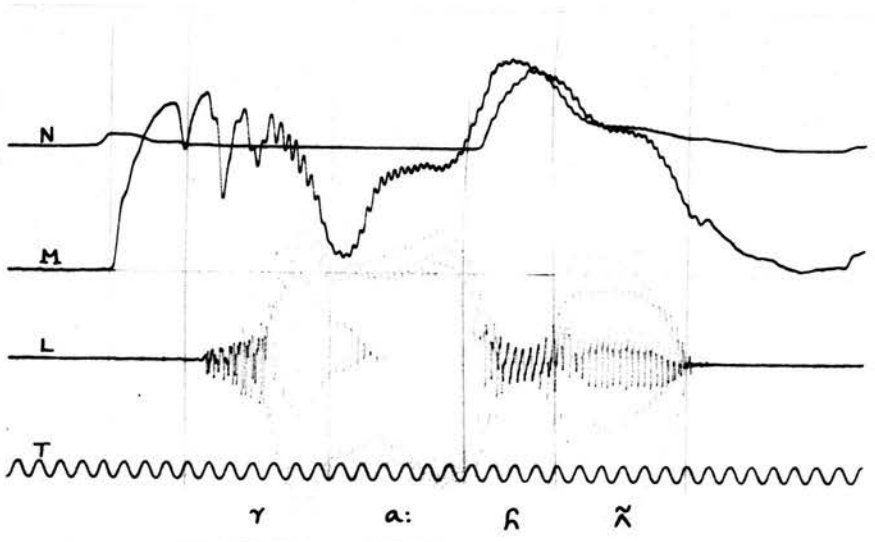
time we see two dips on the mouth tracing corresponding to the segment transcribed [r]. The two dips indicate two taps - a trill. (see kymogram 156 of the same word in which [ɾ] was used). These two kymograms (156 and 162) illustrate that [r] and [ɾ] are free variants.

7.9.2.13 Kymograms 163 and 164 illustrate the use of [r] and [ɾ] in word-final position. (In the orthography it is always ɾ and never r).

VOICED ALVEOLAR TRILL [r]



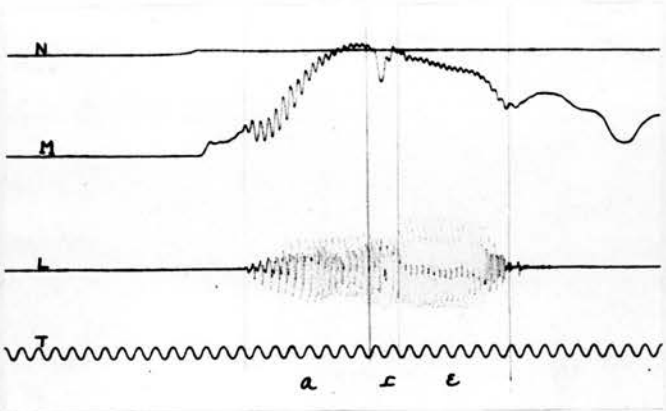
Kgm. 154
[rɑmbɤ] (saw-n.) — initial [r] — orthographic բ



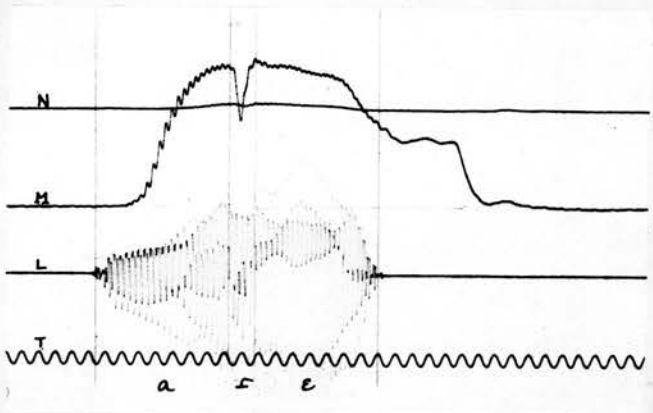
Kgm. 155
[rɑ:hɤ] (a tune) — initial [r] — orthographic բ

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

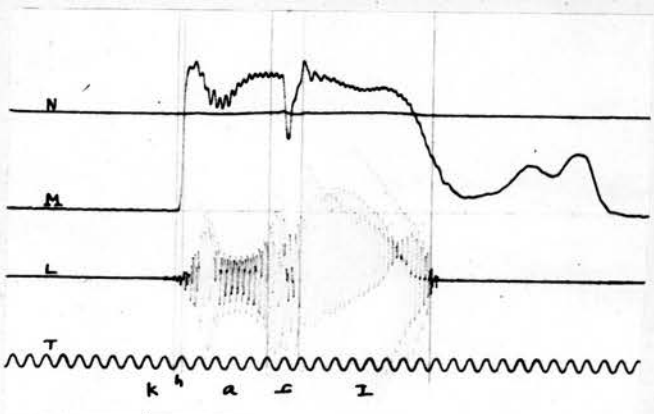
VOICED ALVEOLAR TAP [ɾ]



Kgm. 156
[aɾɛ] (half) — intervocalic [ɾ] — orthographic r



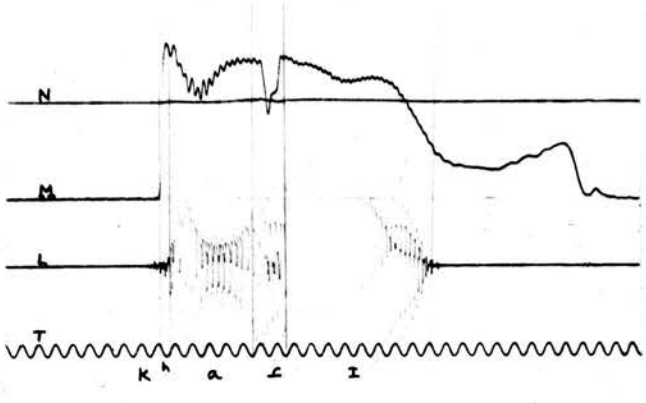
Kgm. 157
[aɾɛ] (a blow with the hand) —intervocalic [ɾ] —orthographic y



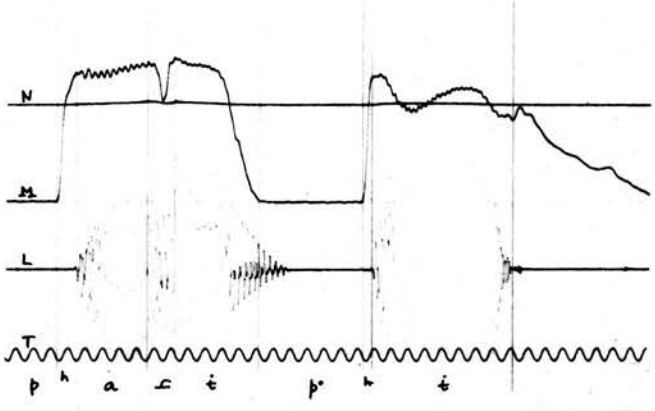
Kgm. 158
[kʰaɾɪ] (charcoal) — intervocalic [ɾ] — orthographic r

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

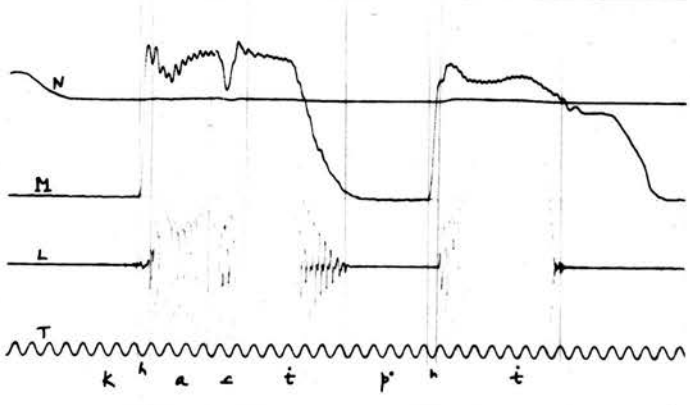
VOICED ALVEOLAR TAP [ɾ]



Kgm. 159
[kʰaɾɪ](curry) — intervocalic [ɾ] — orthographic ர



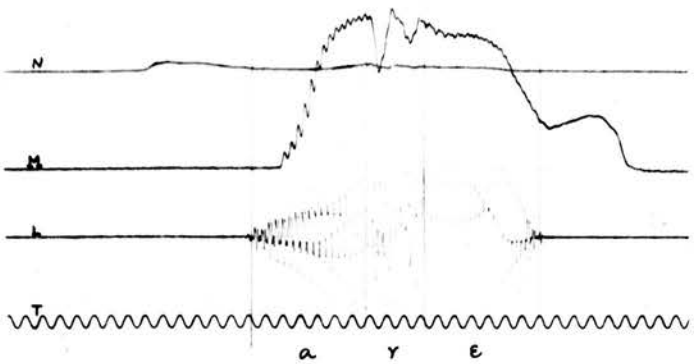
Kgm. 160
[pʰaɾiṗ·i] (lentils) — intervocalic [ɾ] — orthographic ட



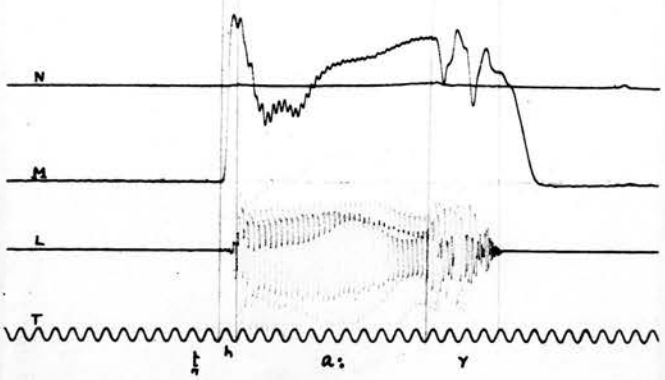
Kgm. 161
[kʰaɾiṗ·i] (black) — intervocalic [ɾ] — orthographic ர

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

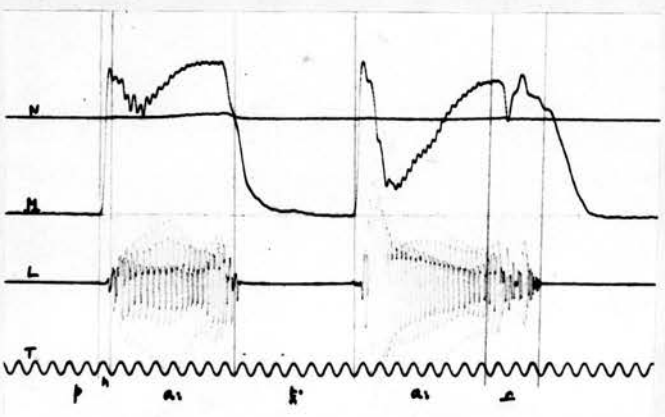
VOICED ALVEOLAR TRILL [ʏ] AND VOICED ALVEOLAR TAP [ɾ]



Kgm. 162
[ɑʏɛ] (half) — intervocalic [r] — orthographic ر



Kgm. 163
[tʼɑːr] (tar) —final [r] — orthographic ر



Kgm. 164
[pʼɑːtʰʼɑːɾ] (he-honorific - saw) — final [ɾ] — orthographic ر

N-Nose out M-Mouth out L-Larynx T-Time (50 cps)

7.9.3 [l] Voiced alveolar lateral flap.

(see 7.7.1.8; Palatograms 94 and 95 and kymogram 146).

7.9.4 [ɽ] Voiced retroflex flap:-

7.9.4.1 The tip of the tongue is taken up and taken near the palatal region. Then it is suddenly and quickly flapped forward. The soft palate is raised. The vocal cords vibrate, producing voice.

7.9.4.2 Palatograms 119 and 120 reproduced on the next page illustrate the articulation of [ɽ]. Palatogram 119 is of the word [pʻaɽɪ] (measure) and palatogram 120 is of the word [əɽɑ̃] (place). In both the palatograms there is a wipe-off on the sides of the palatal zone (zone 6). In both the palatograms, the zones above the palatal zone (the pre-palatal zone and the post-alveolar zone) are messy. This indicates that the tip of the tongue that is quickly flapped forward removes some marking medium from these zones. (Compare palatograms 80 and 81 illustrating the articulation of the retroflex nasal flap and palatograms 103 and 104 illustrating the articulation of the retroflex lateral flap).

Distribution of [ɽ]:-

7.9.4.3 [ɽ] occurs only intervocalically, as in

[aːɽɨ]	(goat)
[pʻaːɽɨ]	(sing - imp.)
[kʻaːɽɨ]	(forest)
[aɽɪ]	(a foot - 12 inches)

Pgm. 119
[pʿaɣɪ] (measure)

Pgm. 120
[əɣɑ̃](place)

The Zones:
1. dental 2. denti-alveolar 3. alveolar 4. post-alveolar
5. pre-palatal 6. palatal 7. post-palatal 8. velar

7.9.5 [ɽ] - Voiced retroflex lateral flap:-

(See 7.7.2.5, palatograms 103 and 104 and kymogram 148).

7.9.6 [ɳ] Voiced retroflex nasal flap:-

(See 7.6.5.5, palatograms 80 and 81 and kymogram 141).

7.10 APPROXIMANTS AND SEMI-VOWELS.

7.10.1 [ʋ] Voiced labio-dental approximant:-

7.10.1.1 The lower lip and the upper teeth are brought into close contact with each other so that the space between them is narrow, but not narrow enough to cause audible friction when the air passes between them. The air that is compressed by pressure from the lungs escapes through this space without any friction. The soft-palate is raised. The vocal cords vibrate, producing voice.

Distribution of [ʋ]

7.10.1.2 (a) [ʋ] occurs initially, as in [ʋaɻɪ] (passage, way) and [ʋa:ɻɛ] (banana).

7.10.1.3 (b) [ʋ] occurs in medial consonant groups as in [jɛʋɭəʋɨ] (how much?) and [aʋɭəʋɨ] (this much).

7.10.1.4 (c) [ʋ] occurs in initial consonant clusters as in [ʋja:βa:ɾÃ] (business) and [ʋja:βa:ɾɪ] (businessman).

7.10.1.5 (d) [ʋ] occurs intervocalically, as in [aʋə] (she) and [kʻaðəʋɨ] (door).

7.10.1.6 (e) [ʋ:] - a long voiced labio-dental approximant occurs intervocalically, as in [ʋaʋ:a:l] (bat - the mammal) and [dʒaʋ:ɨ] (a jelly-like substance).

7.10.1.7 (f) Neither [ʋ] nor [ʋ:] occurs finally.

7.10.2 [ɻ] Voiced retroflex approximant:-

7.10.2.1 The tip of the tongue is curled back and brought near the hard palate so that the distance between them is narrow, but not narrow enough to cause audible friction. The air that is compressed by pressure from the lungs escapes through this space without any friction. The soft-palate is raised. The vocal cords vibrate, producing voice.

7.10.2.2 On the following page is reproduced a photographic print of an X-ray. The X-ray was taken when the writer was articulating the approximant [ɻ]. The curled-up tip of the tongue, and the space between the tip of the tongue and the hard palate can be seen in the print.

Distribution of [ɻ]:-

7.10.2.3 As mentioned earlier (see 7.8.5.2) [ɻ] occurs both as a fricative and as an approximant, the two of them being free variants. The more commonly used sound is the approximant, the fricative being used for emphasis or for teaching a pupil when he confuses between [ɻ] and [l].

7.10.2.4 (a) [ɻ] does not occur initially in a word.

Tongue-position of the voiced retroflex approximant [ɻ] reproduced from the photographic print of an X-ray.

7.10.2.5 (b) [ɻ] occurs intervocalically, as in

[maɻɛ] (rain)

[pʻaɻɪ] (guilt)

[pʻɔɻɔ] (worm)

[aːɻÃ] (depth)

7.10.2.6 (c) [ɻ] occurs finally, as in

[kʻuːɻ] (a type of gruel)

[pʻaːɻ] (waste)

These words are also pronounced with an epenthetic vowel at the end as [kʻuːɻɔ] and [pʻaːɻɨ] respectively.

7.11 SEMI VOWELS

7.11.1 [j] Voiced palatal semi vowel.

7.11.1.1 In articulating [j] the 'front' of the tongue is raised in the direction of the hard palate as, for example, in the articulation of [iː] or [ɪ]. The lips are spread. The soft palate is raised so as to block the nasal passage of air. The vocal cords vibrate, producing voice. This is the starting point of the speech organs in forming [j]. The speech organs then swiftly move to the position of another sound.

Distribution of [j]:-

7.11.1.2 (a) [j] occurs initially in a word. For example,

[jaːnɛ] (elephant)

[jɛlɛ] (leaf)

7.11.1.3 (b) [j] occurs medially, as in [kʻaːjɔ̃Ã] (letter, paper), [ʋaːjɔ̃aː] (time limit).

7.11.1.4 (c) [j] occurs intervocalically, as in [majɪl] (peacock), [t̪ʻa:ja:ɾ] (mother), [majəkʻÃ] (giddiness) and [pʻajəɾɨ] (green gram).

7.11.1.5 (d) [j] occurs finally, as in

[pʻoj] (lie, falsehood)

[kʻa:j] (unripe fruit)

[na:j] (dog)

[nɛj] (clarified butter)

These words are also pronounced with a final epenthetic vowel. While adding the vowel, the [j] is lengthened if the vowel preceding it is short. Thus the four words listed above are also pronounced [pʻoj:ɪ] (lie, falsehood), [kʻa:jɪ] (unripe fruit), [na:jɪ] (dog) and [nɛj:ɪ] (clarified butter) respectively.

7.11.1.6 <u>[j:] long, voiced palatal semi vowel</u>:-

[j:] is formed exactly as [j] described above, but the speech organs remain in the [j] position for a longer duration before moving on to the position of the next sound in a word.

[j:] occurs only intervocalically. e.g.,

[kʻoj:a:] (guava)

[ʋɛj:əl] (heat of the sun)

7.11.2 <u>[w] Voiced labio velar semi vowel</u>:-

7.11.2.1 In forming [w] the speech organs start in position for [u:] or [o]. That is, the lips are closely rounded. The back of the tongue is raised in the direction of the soft palate. The

soft palate is raised. The vocal cords vibrate, producing voice. From this position the speech organs swiftly move to the position of another speech sound.

Distribution:-

7.11.2.2 [w] occurs only initially, and that as an on-glide when the next vowel is [o:] or [o]. e.g.,

[wo:ɾÃ]	(corner)
[wo:nɑ:j]	(wolf)
[won:ɷ]	(one)
[woɾɛ]	(case, cover).

Chapter VIII

A Brief Phonemic Analysis of the Dialect of Tamil under survey.

(pages 436 - 465)

Chapter VIII

A Brief Phonemic Analysis of the Dialect of Tamil Under Survey.

8.0 Detailed descriptions of the vowels and consonants that occur in the dialect of Tamil under survey have been given elsewhere in this thesis. (see Chapters IV and VII). In this chapter the distributional characteristics of the vowel and consonant phones are briefly referred to with a view to grouping them into phonemes. To establish the phonemic difference between any two sounds occurring in the dialect, minimal pairs are given wherever possible. However, in certain cases it was found that minimal pairs could not be found. In such cases, near-minimal pairs are given.

8.1. VOWELS - ORAL:-

8.1.1 As stated earlier (see 4.1.1) there are fourteen oral vowel phones in the dialect of Tamil under survey. These fourteen vowel phones are represented by the symbols [i:], [ɪ], [e:], [ɛ], [a:], [ɑ], [o:], [o], [u:], [ʊ], [ə:], [ə], [ɨ:] and [ɨ] in this work. As can be seen from the notations used above, seven of these vowels are long (in transcribing which the length mark [:] has been used) and seven others short. The seven long vowels are always longer than their corresponding short vowels in identical phonetic environments. (For a fuller discussion of vowel length

see 4.2.1 - 4.2.9).

8.1.2 Each long vowel contrasts with its corresponding short vowel in minimal pairs. Seven sets of examples are given below to illustrate this:-

[i:]and[ɪ]	[i̤:ɾi]	(gums) - [ɪɾi]	(stay - imp.)
[e:]and[ɛ]	[t̪ʻe:ɾi](chariot)	- [t̪ʻɛɾi]	(street)
[a:]and[a]	[ma:lɛ] (garland)	- [malɛ]	(mountain)
[o:]and[o]	[kʻo:ɽɪ] (ten million)	- [kʻoɽɪ]	(cloth-line)
[u:]and[ɷ]	[pʻu:t̪ʻɷ](lock)	- [pʻɷt̪:ɷ]	(a breakfast savoury)
[ə:]and[ə]	[kʻə:t̪ʻɨ](having asked)	- [kʻət̪:ɨ]	(having lost)
[ɨ:]and[ɨ]	[ɨ:ɽɨ] (an equivalent)	- [ɨɽɨ]	(take - imp.)

8.1.3 Apart from this, there are several vowels which contrast with several others in minimal or near-minimal pairs. A few of these are given below:-

8.1.4 [i:] contrasts with [a] and [ə:].

[ɸi:pʻɨ] (comb)

[ɸap:ɨ] (suck - imp.)

[ɸə:p:ɨ] (red)

8.1.5 [ɪ] contrasts with [e:], [ɛ], [a:], [a], [o:], [o], [u:] and [ɷ].

[pʻɪt̪:ɨ] (madness)

[pʻe:t̪ʻɨ] (prattle - imp.)

[pʻɛt̪:ɨ] (having begotten)

[pʻa:t̪ʻɨ] (having seen)

[pʻat̪:ɨ] (ten)

[pʻo:t̪ʻɷ] (cover with a blanket - imp.)

[pʻoṯːɔ] (cover - imp.)

[pʻuːṯ·ɔ] (having blossomed)

[pʻoṯːɔ] (ant-hill)

8.1.6 [eː] contrasts with [aː], [ɑ], [o] and [uː]

[meːlɛ] (on top of)

[maːlɛ] (garland)

[mɑlɛ] (mountain)

[molɛ] (breast)

[muːlɛ] (corner)

8.1.7 [ɑ] contrasts with [o], [oː] and [uː]

[kʻɑɽɛ] (shop)

[kʻoɽɛ] (umbrella)

[kʻoːɽɛ] (summer)

[kʻuːɽɛ] (basket)

8.1.8 Apart from this, every long vowel contrasts with every other long vowel and every short vowel contrasts with every other short vowel. These contrasts are illustrated below:- [1]

Long vowels:-

8.1.9 [iː]

[iː]and[eː]	[pʻiːṯ·ɑl]	(rags)	-	[pʻeːṯ·ɑl]	(prattle-n.)
[iː]and[aː]	[iːɾɨ]	(gums)	-	[aːɾɨ]	(six)
[iː]and[oː]	[kʻiːɾɛ]	(greens)	-	[kʻoːɾɛ]	(a kind of grass)
[iː]and[uː]	[kʻiːɾɛ]	(greens)	-	[kʻuːɾɛ]	(thatched roof)
[iː]and[əː]	[ɕiːpʻɨ]	(comb)	-	[ɕəːpʻɨ]	(red)
[iː]and[ɨː]	[ɕiːṭʻɤ]	(chintz)	-	[cɨːṭʻɨ]	(a note)

---

1. Six pairs of examples under each vowel heading produces certain amount of redundant materials. But this is done here because it gives the contrasts one sees at a glance.

8.1.10 [e:]

[e:]and[i:]	[p'e:ʈ'al](prattle-n.)	- [p'i:ʈ'al] (rags)
[e:]and[ɑ:]	[p'e:ɾɨ] (name)	- [p'ɑ:ɾɨ] (see-imp.)
[e:]and[o:]	[ne:k'ɨ] (me-dat.)	- [no:k'o] (you-dat.)
[e:]and[u:]	[me:lɛ] (on top of)	- [mu:lɛ] (corner)
[e:]and[ə:]	[ɕe:ɾɪ] (slum)	- [ɕə:ɾɨ] (slushy mud)
[e:]and[ɨ:]	[ne:ʈ'ɨ](yesterday)	- [nɨ:ʈ'ɨ](having become ashes)

8.1.11 [ɑ:]

[ɑ:]and[i:]	[k'ɑ:ɾɛ] (mortar)	- [k'i:ɾɛ] (greens)
[ɑ:]and[e:]	[k'ɑ:lɪ] (empty)	- [k'e:lɪ] (fun)
[ɑ:]and[o:]	[p'ɑ:ʈ'ɪ] (grandmother)	- [p'o:ʈ'ɪ] (competition)
[ɑ:]and[u:]	[p'ɑ:nɛ] (pot)	- [p'u:nɛ] (cat)
[ɑ:]and[ə:]	[ɑ:ɽɨ] (goat)	- [ə:ɽɨ] (leaf of a book)
[ɑ:]and[ɨ:]	[ɑ:ɽɨ] (goat)	- [ɨ:ɽɨ](an equivalent)

8.1.12 [o:]

[o:]and[i:]	[k'o:ɾɛ](a type of grass)	- [k'i:ɾɛ] (greens)
[o:]and[e:]	[mo:ßÃ](excessive liking)	- [me:ßÃ] (clouds)
[o:]and[ɑ:]	[p'o:j](having gone)	- [p'ɑ:j] (mat)
[o:]and[u:]	[p'o:] (go - imp.)	- [p'u:] (flower)
[o:]and[ə:]	[ʈ'o:ɽo](ear-ring)	- [ʈ'ə:ɽɨ](search-imp.)
[o:]and[ɨ:]	[ʈ'o:ʈ'ɪ](scavenger)	- [ʈ'ɨ:ʈ'ɪ](having sharpened)

8.1.13 [u:]

[u:]and[i:]	[pʻu:] (flower)	- [pʻi:] (excreta)
[u:]and[e:]	[kʻu:lɪ] (wages)	- [kʻe:lɪ] (fun)
[u:]and[ɑ:]	[kʻu:lɪ] (wages)	- [kʻɑ:lɪ] (empty)
[u:]and[o:]	[kʻu:ɽo] (nest)	- [kʻo:ɽo] (line)
[u:]and[ə:]	[u:ɾo] (town)	- [ə:ɾɨ] (climb - imp.)
[u:]and[ɨ:]	[u:ʈʻɪ](having fed the child)	- [ɨ:ʈʻɪ] (spear)

8.1.14 [ə:]

[ə:]and[i:]	[ɸə:ɾɨ](slushy mud)	- [ɸi:ɾɨ] (dowry)
[ə:]and[e:]	[ɸə:ɾɨ](slushy mud)	- [ɸe:ɾɪ] (slum)
[ə:]and[ɑ:]	[ə:ɽɨ](leaf of a book)	- [ɑ:ɽɨ] (goat)
[ə:]and[o:]	[t̪ʻə:ɽɨ](search - imp)	- [t̪ʻo:ɽo] (ear-ring)
[ə:]and[u:]	[kʻə:ʈʻɨ] (having asked)	- [kʻu:ʈʻo](a type of curry)
[ə:]and[ɨ:]	[ə:ɽɨ] (leaf of a book)	- [ɨ:ɽɨ](an equivalent)

8.1.15 [ɨ:]

[ɨ:]and[i:]	[ɸi:ʈʻɨ](a note)	- [ɸi:ʈʻɪ] (chintz)
[ɨ:]and[e:]	[nɨ:t̪ʻɨ](having become ashes)	- [ne:t̪ʻɨ] (yesterday)
[ɨ:]and[ɑ:]	[ɨ:ɽɨ](an equivalent)	- [ɑ:ɽɨ] (goat)
[ɨ:]and[o:]	[t̪ʻɨ:ʈʻɪ] (having sharpened)	- [t̪ʻo:ʈʻɪ](scavenger)
[ɨ:]and[u:]	[ɨ:ʈʻɪ] (spear)	- [u:ʈʻɪ](having fed the child)
[ɨ:]and[ə:]	[ɨ:ɽɨ](an equivalent)	- [ə:ɽɨ] (leaf of a book)

Short Vowels:-

8.1.16 [ɪ]

[ɪ]and[ɛ]	[p'anɪ] (dew)	- [p'anɛ] (palmyra)
[ɪ]and[a]	[p'ɪɾɪ](untie-imp.)	- [p'aɾɪ] (pluck-imp.)
[ɪ]and[o]	[ɸɪɾɪ] (laugh-imp.)	- [ɸoɾɪ] (itch,rash)
[ɪ]and[ɔ]	[ɔɾɪ](hanging net for food)	- [ɔɾɔ] (learn by rote)
[ɪ]and[ə]	[k'aɾɪ] (curry)	- [k'aɾə] (milk - imp.)
[ɪ]and[i]	[ʋaɳɖɪ] (cart)	- [ʋaɳɖi] (beetle)

8.1.17 [ɛ]

[ɛ]and[ɪ]	[k'i:ɾɛ] (greens)	- [k'i:ɾɪ] (mongoose)
[ɛ]and[a]	[p'ɛʈ:i] (having begotten)	- [p'aʈ:i] (ten)
[ɛ]and[o]	[k'ɛɳdʒal](cringing)	- [k'oɳdʒal] (fondling)
[ɛ]and[ɔ]	[ʈ'oɽɛ] (thigh)	- [ʈ'oɽɔ] (touch - imp).
[ɛ]and[ə]	[k'u:ɽɛ] (basket)	- [k'u:ɽə] (along with)
[ɛ]and[i]	[a:ɳɛ] (oath)	- [a:ɳi] (male)

8.1.18 [a]

[a]and[ɪ]	[ʈ'aɾɪ](a weaver's loom)	- [ʈ'ɪɾɪ] (wick)
[a]and[ɛ]	[p'aɾi] (pimple)	- [p'ɛɾi] (beget - imp.)
[a]and[o]	[p'aɳÃ] (money)	- [p'oɳÃ] (corpse)
[a]and[ɔ]	[k'aʈ:ɪ] (boil-n.)	- [k'ɔʈ:ɪ](young one)
[a]and[ə]	[aɽÃ](stubbornness)	- [əɽÃ] (place)
[a]and[i]	[k'aɭɪ](a savoury)	- [k'iɭɪ] (parrot)

8.1.19 [o]

[o]and[ɪ]	[p'oɾɪ] (a trap)	- [p'ɪɾɪ] (untie - imp.)
[o]and[ɛ]	[noj](coarse meal, groats)	- [nɛj] (clarified butter)
[o]and[ɑ]	[k'oɽɛ] (umbrella)	- [k'ɑɽɛ] (shop)
[o]and[ɷ]	[k'o̤t:o] (dig - imp.)	- [k'o̤t:o] (punch - imp.)
[o]and[ə]	[ɸo̤t:ɛ] (infected vegetable)	- [ɸə̤t:ɛ] (rotten leaves)
[o]and[ɨ]	[k'oɽ:ə] (to throw)	- [k'ɨɽ:ə] (nearby)

8.1.20 [ɷ]

[ɷ]and[ɪ]	[p'ɷʐɷ] (worm)	- [p'ɷʐɪ] (squeeze-imp.)
[ɷ]and[ɛ]	[k'u:ɽɷ] (cage,nest)	- [k'u:ɽɛ] (basket)
[ɷ]and[ɑ]	[k'oɾɪ] (a mark)	- [k'ɑɾɪ] (curry)
[ɷ]and[o]	[p'ɷɳ:ɷ] (wound-n.)	- [p'oɳ:ɷ] (girl)
[ɷ]and[ə]	[t̤'ɷlɪ] (a drop)	- [t̤'əlɪ] (sprinkle-imp.)
[ɷ]and[ɨ]	[k'ɷʐɪ] (pit)	- [k'ɨʐɪ] (tear - imp.)

8.1.21 [ə]

[ə]and[ɪ]	[k'ɑɾə] (milk-imp.)	- [k'ɑɾɪ] (curry)
[ə]and[ɛ]	[k'u:ɽə] (along with)	- [k'u:ɽɛ] (basket)
[ə]and[ɑ]	[əɽɑ̃] (place)	- [ɑɽɑ̃] (stubbornness)
[ə]and[o]	[k'əʐəʊɪ] (old woman)	- [k'oʐəʊɪ] (rolling pin, pestle)
[ə]and[ɷ]	[k'u:ɽə] (along with)	- [k'u:ɽɷ] (cage, nest)
[ə]and[ɨ]	[p'ɑɳ:ə] (to do)	- [p'ɑɳ:ɨ] (do - imp.)

8.1.22 [ɨ]

[ɨ]and[ɪ]	[k'ɑ:lɨ] (leg)	- [k'ɑ:lɪ] (empty)
[ɨ]and[ɛ]	[ɑ:ɳɨ] (male)	- [ɑ:ɳɛ] (oath)
[ɨ]and[ɑ]	[k'ɨɭɪ] (parrot)	- [k'ɑɭɪ] (a savoury)
[ɨ]and[o]	[k'ɨʈ:ə] (nearby)	- [k'oʈ:ə] (to throw)
[ɨ]and[ɷ]	[k'ɨʐɪ] (tear-imp.)	- [k'ɷʐɪ] (pit)
[ɨ]and[ə]	[k'ɨʈ:ə] (nearby)	- [k'əʈ:ə] (bad)

8.1.23 Taking into account the fact that every long vowel contrasts with every other long vowel, every short vowel contrasts with every other short vowel and that every long vowel contrasts with its corresponding short vowel, these fourteen vowels are assigned to fourteen different phonemes. The fourteen vowel phonemes are represented by the symbols /i:/, /i/, /e:/, /e/, /ɑ:/, /ɑ/, /o:/, /o/, /u:/, /u/, /ə:/, /ə/, /ɨ:/ and /ɨ/. As pointed out in chapter IV, there is not only a difference in quantity between [i:] and [ɪ], [e:] and [ɛ] etc., there is a difference in vowel quality, too. But still the same symbol has been chosen to represent [i:] and [ɪ] in phonemic transcriptions because of simplicity. The seven long vowel phonemes are notated with the length mark : even in phonemic transcriptions.

The seven vowel phonemes are discussed very briefly below:-

8.1.24 /i:/ :- <u>allophones</u>:- [i:] - a close unrounded front vowel. This vowel is always long,

the degree of length depending upon adjacent segments. (see 4.2.7) [i:] can occur initially, medially and finally only in vocatives. Examples:-

[i:ɾi̪] (gums)

[kʻi:ɾɛ] (greens)

[pʻa:ʈʻi:] (grandmother! - voc.)

8.1.25 /i/ :- allophones:- (a) [ɪ] - a front unrounded vowel between close and half close. This vowel is always short. the degree of length of this vowel depends upon adjacent sounds. (see 4.2.7). [ɪ] occurs initially, medially and finally. Examples:-

[ɪp:ə] (now)

[pʻɪɾɪ] (untie - imp.)

[t̪ʻambɪ] (younger brother)

(b) In spontaneous speech, word-final [ɪ] is slightly opener than word-initial and word-medial [ɪ].

8.1.26 /e:/ :- allophones:- (a) [e:] - a long, unrounded front vowel, between cardinal vowels 2 and 3. This vowel is always long, its length depending upon adjacent sounds.

(see 4.2.7). [e:] occurs medially, and finally only in drawled syllables. Examples:-

[me:lɛ] (on top of)

[jɛle: jɛle:] (leaves! leaves! - a vendor calling out)

(b) [je:] - Orthographic initial e: is always pronounced with an initial palatal on-glide. [je:] occurs only initially in a word. Examples:-

[je:ɾɨ] (plough)

[je:ɾɪ] (lake)

8.1.27 /e/ :- allophones:- (a) [ɛ] a short, unrounded front vowel between half open and open, but nearer half-open. This vowel is always short, its length depending upon adjacent sounds. (see 4.2.7) [ɛ] occurs medially and finally in a word. Examples:-

[nɛɾɨpˑɨ] (fire)

[t̪ʻɑlɛ] (head)

(b) Word-final [ɛ] is slightly opener than word-initial and word-medial [ɛ].

(c) [jɛ] - orthographic initial e is always [jɛ] in speech. [jɛ]

occurs only initially in a word. Example:-

[jɛlɛ] (leaf)

8.1.28 /a:/ :- allophones:- [a:] an open vowel between cardinal vowels 4 and 5, but nearer 5. This vowel is always long, its length depending upon adjacent sounds. (see 4.2.7). [a:] occurs initially, medially and finally in words. Examples:-

[a:ɾɨ] (six)

[pʻa:ɾɨ] (see - imp.)

[ap:a:] (father)

8.1.29 /a/ :- allophones:- [a] a short open vowel between front and back, but nearer back than front. This vowel is always short. [a] occurs initially and medially in a word. Examples:-

[ap:ə] (then)

[pʻaɽɪ] (a measure)

8.1.30 /o:/ :- allophones:- (a) [o:] a long, rounded back vowel between half close and half-open, but nearer half-close. This vowel is always long, with varying degrees of length according to adjacent segments. [o:] occurs medially and finally in words.

Examples:-

[pʻo:ʈ·ɪ] (competition)

[pʻo:] (go - imp.)

(b) [wo:] - Orthographic initial **o:** is always [wo:] in speech, with an initial labio-velar on-glide. [wo:] occurs only initially in a word. Example:-

[wo:nɑ:j] (wolf)

8.1.31 /o/ :- allophones:- (a) [o] a short, rounded, back vowel between half-close and half-open. [o] is always short. [o] occurs medially in a word. Example:-

[pʻoʈ:ɪ] (box)

(b) [wo] - Orthographic initial **o** is always pronounced with an initial labio-velar on-glide. [wo] occurs only initially. Example:-

[won:o] (one)

8.1.32 /u:/ :- allophone:- [u:] - a long, close, back rounded vowel. [u:] occurs initially, medially and finally. Examples:-

[u:mɛ] (dumb person)

[pʻu:ʤɛ] (worship)

[pʻu:] (flower)

8.1.33 /u/:- allophone:- [ɷ] - a short, back rounded vowel between close and half-close. [ɷ] occurs initially, medially and finally. Examples:-

[ɷmɪ] (husk)

[kʻɷʐɪ] (pit)

[pʻuːʈʻɷ] (lock)

8.1.34 /ə:/:- allophone:- [ə:] a long, central unrounded vowel, very near half-open. [ə:] occurs initially and medially in words. Examples:-

[ə:ʐɨ] (seven)

[kʻə:ʐʊɪ] (question)

8.1.35 /ə/:- allophone:- [ə] - a short, central, unrounded vowel, very near half-open. [ə] occurs initially, medially and finally in words. Examples:-

[əʈːɨ] (eight)

[kʻəʈːə] (bad)

[kʻuːɽə] (along with)

8.1.36 /ɨ:/:- allophone:- [ɨ:] - a long, unrounded central vowel between half close and close. [ɨ:] occurs initially and medially in words. Examples:-

[ɨːʈʻɪ] (spear)

[ɸɨːʈʻɨ] (a note)

8.1.37 /ɨ/:- allophone:- [ɨ] - a short, unrounded central vowel, very near half-close. [ɨ] occurs initially, medially and finally in words. Examples:-

[ɨɽɨ] (take - imp.)

[kʻɨzɹ] (tear - imp.)

[kʻaɽ:ɨ] (shout - imp.)

8.2 NASAL VOWELS:-

8.2.1 It has been pointed out in the section on Nasal vowels (see 4.4.1 - 4.4.20) that there are six nasal vowel phones in the dialect of Tamil under survey. These are notated [ẽ:], [ɛ̃], [ã:], [ʌ̃], [õ] and [ɯ̃] in this analysis.

8.2.2 Two of these contrast with their oral counterparts in minimal pairs. To illustrate:-

[pʻo:ɾɛ] (you go) - [pʻo:ɾɛ̃] (I go)

[pʻo:ɾa:] (she goes) - [pʻo:ɾã:] (he goes)

8.2.3 Two others occur very frequently in word-final position. For example:-

[maɾʌ̃] (tree)

[avʌ̃] (he)

[pʻaɽʌ̃] (picture)

[vaɾɯ̃] (It'll come)

[ɪɾɨkʻɯ̃] (It will be)

[ɽʻɛɾɪjɯ̃] (I know)

8.2.4 The other two occur far less frequently. For example:-

[jẽ:] (why?)

[pʻoɾõ] (enough)

8.2.5 All the six nasal vowels occur only in word-final position. The question arises as to how to accommodate

these nasal vowels in the phonemic system. There are two solutions open here:

(a) Consider the nasal vowels as separate phonemes.

(b) Set up a phoneme of nasalization and consider the nasal vowels as a combination of the oral vowels and the phoneme of nasalization.

8.2.6 Setting up separate nasal vowel phonemes appears inelegant as it enlarges the phonemic inventory considerably. Further, these nasal vowels occur only in word-final position. Again, not all the nasal vowels contrast phonemically with their oral vowel counterparts. A nasalization phoneme is set up which is symbolized /V^N/ where /V/ stands for any vowel and /^{N}/ stands for nasalization. Thus [ẽ:] can be assigned to the /e:/ phoneme, [ɛ̃] to the /e/ phoneme, [ɑ̃:] to the /ɑ:/ phoneme and [õ] to the /u/ phoneme, with the addition of the phoneme of nasalization in each case.

8.2.7 We still have to accommodate [ʌ̃] and [ɯ̃] in the phonemic inventory. In this analysis [ʌ̃] is assigned to the /ə/ phoneme and [ɯ̃] to the /ɨ/ phoneme, with the addition of the phoneme of nasalization in each case.

[ʌ̃] is assigned to the phoneme /ə/ because:-

(a) [ə̃] does not occur in the dialect.

(b) oral [ʌ] does not occur in the dialect.

Similarly, [ɯ̃] is assigned to the phoneme [ɨ] because:-

(a) [ɨ̃] does not occur in the dialect.

(b) [ʉ̃] does not occur in the dialect.

8.2.8 The six nasal vowels are given below, in phonemic and phonetic versions, with illustrative examples. The examples are transcribed phonemically and phonetically.

/e:^{N}/	[ẽ:]
/e^{N}/	[ɛ̃]
/a:^{N}/	[ã:]
/u^{N}/	[õ]
/ə^{N}/	[ʌ̃]
/ɨ^{N}/	[ʉ̃]

8.2.9 Illustrative Examples.

[ẽ:]	/e:^{N}/	[jẽ:]	(why?)
[ɛ̃]	/po:ʈe^{N}/	[p'o:ʈ'ɛ̃]	(I put)
[ã:]	/pu:ɾa:^{N}/	[p'u:ɾã:]	(centipede)
[õ]	/po:ɾu^{N}/	[p'o:ɾõ]	(enough)
[ʌ̃]	/maɾə^{N}/	[maɾʌ̃]	(tree)
[ʉ̃]	/iɾiɨ^{N}/	[ɪɾɨk'ʉ̃]	(It will be)

8.3 DIPHTHONGS:-

8.3.1 There are two diphthongs in Tamil, symbolized in this thesis as [ai] and [ao] respectively. These are described and their distributional possibilities analysed in chapter IV (see 4.5.1 to 4.5.14). These diphthongs do not occur very frequently in speech.

8.3.2 The question now is whether to set up two separate diphthong phonemes or to consider the diphthongs as a sequence of two vowels. The latter procedure has been

adopted here because:

(a) Setting up two separate phonemes will enlarge the phonemic inventory.

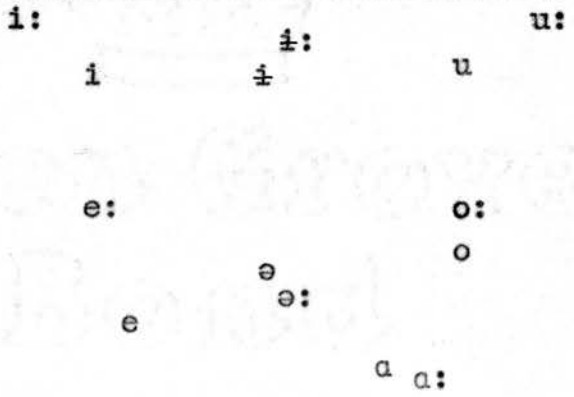
(b) the two diphthongs occur rarely in speech.

(c) there is already an /i/ phoneme, an /a/ phoneme and an /u/ phoneme and the diphthongs can therefore be considered a combination of /a/ and /i/ in the case of [ai] and of /a/ and /u/ in the case of [aʊ].

8.3.3 A few examples are given below, illustrating the occurrence of the two diphthongs.

[ai]	/pai/	[pʻai]	(bag)
	/kai/	[kʻai]	(hand)
	/mai/	[mai]	(collyrium)
	/paijəᴺ/	[pʻaijɐ̃]	(boy)
[aʊ]	/aʊʋe/	[aʊʋɛ]	(proper name)
	/maʊnəᴺ/	[maʊnɐ̃]	(silence)
	/ʋaʊʋa:l/	[ʋaʊʋa:l]	(bat - the mammal)

8.3.4 <u>The Tamil vowel phonemic inventory</u>:-



8.3.5 In addition to this, there is a phoneme of nasalization, symbolized /Vᴺ/, V being any oral vowel.

8.4 CONSONANTS:-

8.4.1 The following consonant phones occur in the dialect of Tamil under survey (taking into account spontaneous speech).

	Bilabial	labio-dental	dental	alveolar/ post-alveolar	Palato alveolar	retro-flex	Palatal/ alveolo-palatal	velar	glottal
stops	[p‘], [p], [p•], [p:], [p^{N}] [b], [b:]		[t̪‘], [t̪], [t̪•], [t̪:], [d̪]	[t̲], [d̲]		[ʈ], [ʈ•], [ʈ:], [ʈ^{N}], [ʈ^{L}], [ɖ] [ɖ:]	[c], [c•], [c:], [c^{N}], [ɟ]	[k‘], [k] [k•], [k:] [g]	
affricates					[tʃ], [tʃ•], [tʃ:], [dʒ], [dʒ:]				
nasals	[m] [m:]		[n̪]	[n] [n:]		[ɳ] [ɳ:]	[ɲ] (palatal)	ŋ	
fricatives	[β]		[ð]	[s]		[ʂ] [ʐ]	[ɕ] alveolo-palatal [j] palatal		[h] [ɦ]
laterals				[l] [l:]		[ɭ] [ɭ:]			
rolled and flapped sounds				[ɾ] [r]		[ɽ]			
approxi-mants		[ʋ] [ʋ:]				[ɻ]			
semi-vowels	[w]						[j] [j:] (both palatal)		

8.5 STOPS

8.5.1 The bilabial, dental, retroflex and velar voiceless stops contrast with each other initially and medially in minimal pairs:-

Initially:-	[pʻɑi]	(bag)
	[t̪ʻɑi]	(name of a month)
	[ʈɑi]	(neck-tie)
	[kʻɑi]	(hand)
Medially:-	[mɑp:ɨ]	(clouds)
	[mɑt̪:ɨ]	(a churner)
	[mɑʈ:ɨ]	(less)
	[mɑk:ɨ]	(moron)

8.5.2 [p] and [b], [t̪] and [d̪], [ʈ] and [ɖ] and [k] and [g] contrast with each other in minimal pairs.

[pʻɑlɐ̃] (a tiny weight) - [bɑlɐ̃] (strength)

[t̪ʻɑnɪjɑ:] (alone) - [d̪ɑnɪjɑ:] (coriander seeds)

[kʻu:pʈɨ] (having summoned) - [kʻu:pɖɨ] (summon - imp.)

[kʻəɽɨ] (be ruined) - [gəɽɨ] (a time or date fixed)

8.5.3 From the contrasting pairs given above, it becomes evident that there should be at least eight phonemes to accommodate the stop consonants. These are notated /p/, /b/, /t̪/, /d̪/, /ʈ/, /ɖ/, /k/ and /g/.

Allophones:- [2]

8.5.4 /p/ [pʻ] /pɑt̪ɨ/ [pʻɑt̪:ɨ] (ten)

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2. Detailed descriptions of these allophones are given in chapter VII. See 7.4

	[p]	/pɾa:ɳi/	[pɾa:ɳɪ]	(living being)
		/apɾəᴺ/	[apɾÃ]	(later on)
	[pˑ]	/pa:p̣a:/	[pʻa:pˑa:]	(child)
		/kaɾip̣i/	[kʻaɾipˑi]	(black)
	[p:]	/upu/	[ʊp:ʊ]	(salt)
	[pᴺ]	/upma:/	[ʊpᴺma:]	(a breakfast savoury)
8.5.5 /b/	[b]	/bajəᴺ/	[bajÃ]	(fear)
		/t̪ambi/	[t̪ʻambɪ]	(younger brother)
		/anbi/	[anbi]	(love)
	[b:]	/ɖabba:/	[ɖab:a:]	(a tin, a can)
	[β][3]	/a:bat̪i/	[a:βat̪ˑi]	(danger)
8.5.6 /t̪/	[t̪ʻ]	/t̪ai/	[tʻai]	(name of a month)
	[t̪]	/t̪ɾa:ɳi/	[t̪ɾa:ɳɪ]	(strength)
		/aɾt̪əᴺ/	[aɾt̪Ã]	(meaning)
	[t̪ˑ]	/ka:t̪i/	[kʻa:t̪ˑi]	(wind)
		/kat̪a:ʐe/	[kʻat̪ˑa:ʐɛ]	(cactus)
	[t̪:]	/pat̪i/	[pʻat̪:i]	(ten)
8.5.7 /ɖ/	[ɖ]	/ɖa:ɖi/	[ɖa:ɽɪ]	(beard)
		/panɖi/	[pʻanɖi]	(ball)
	[ð][4]	/ka:ɖi/	[kʻa:ði]	(ear)
		/ka:jɖəᴺ/	[kʻa:jðÃ]	(letter)

3. [β] occurs only intervocalically. [b] does not occur intervocalically. [b:] occurs intervocalically and this is taken as the same consonant occurring twice. So [β] is assigned to the phoneme /b/.
4. [ð] occurs intervocalically and in the environment [-jðV-] where [ɖ] does not occur.

8.5.8	/ʈ/	[ʈ]	/ʈai/	[ʈai]	(neck-tie)
			/ku:pʈɨ/	[kʰu:pʈɨ]	(having summoned)
		[ʈᴺ]	/ʧaʈɳi/	[ʧ aʈᴺɳɪ]	(chutney)
		[ʈᴸ]	/poʈləᴺ/	[pʰoʈᴸlÃ]	(packet)
		[ʈ̲][5]	/oʈɾe/	[woʈ̲ɾɛ]	(cobweb)
		[ʈ•]	/pa:ʈi/	[pʰa:ʈ•ɪ]	(grandmother)
		[ʈ:]	/paʈi/	[pʰaʈ:ɪ]	(cowshed)
8.5.9	/ɖ/	[ɖ]	/ɖabba:/	[ɖab:a:]	(a tin, a can)
			/ku:pɖɨ/	[kʰu:pɖɨ]	(summon - imp.)
		[ɖ̲][6]	/o:ɖɾe/	[wo:ɖ̲ɾɛ]	(you're running)
			/ɖɾa:ma:/	[ɖ̲ɾa:ma:]	(drama)
		[ɖ:]	/laɖɖɷ/	[laɖ:ɷ]	(a sweetmeat)
		[ɽ][7]	/paɖi/	[pʰaɽɪ]	(measure)
8.5.10	/k/	[kʰ]	/ka:ɖɨ/	[kʰa:ɽɨ]	(forest)
		[k]	/akɾəməᴺ/	[akɾəmÃ]	(unjust)
		[k•]	/pa:kɨ/	[pʰa:k•ɨ]	(arecanut)
		[k:]	/aka:/	[ak:a:]	(elder sister)
8.5.11	/g/	[g]	/go:nd̲u/	[go:nd̲ɷ]	(glue-n.)
			/ʨange/	[tʰaŋgɛ]	(younger sister)

5. [ʈ̲] occurs only before [ɾ] where [ʈ], [ʈ•] or [ʈ:] do not occur.
6. [ɖ̲] occurs only before [ɾ] where [ɖ] and [ɖ:] do not occur.
7. [ɽ] occurs only intervocalically where [ɖ], [ɖ:] and [ɖ̲] do not occur.

8.6 AFFRICATES:-

8.6.1 The voiceless and voiced palato-alveolar affricates occur in analogous phonetic environments - both can occur initially, intervocalically and medially in consonant groups. Hence we have to set up two phonemes to accommodate the two affricates and these are notated /tʃ / and /ʤ / in this account.

allophones:-

8.6.2	/tʃ /	[tʃ]	/tʃ i:/	[tʃ i:]	(fie!)
			/aɾtʃ ane/	[aɾtʃ anɛ]	(worship)
		[t̆ʃ]	/pu:tʃ i/	[pʻu:t̆ʃ ɪ]	(insect)
		[t:ʃ]	/patʃ e/	[pʻat:ʃɛ]	(green)
8.6.3	/ʤ/	[ʤ]	/ʤ a:ɖi/	[ʤ a:ɽɪ]	(jar)
			/ʋ adʒ ɾəᴺ/	[ʋadʒ ɾÃ]	(glue used by carpenters)
			/ɾa:ʤ a:/	[ra:ʤ a:]	(king)
			/paɲʤ ɨ/	[pʻaɲʤ ɨ]	(cotton)
		[ʤ:] [8]	/baʤ i/	[baʤ:ɪ]	(a savoury)
			/laʤ e/	[laʤ:ɛ]	(shyness)

---

8. [ʤ] and [ʤ:] can both occur intervocalically. Still they are assigned to the same phoneme because they are in complementary distribution. The vowel preceding [ʤ] is always long and the vowel preceding [ʤ:] is always short.

8.7 NASALS:-

8.7.1 Of the nasals, the bilabial nasal, the alveolar nasal and the retroflex nasal contrast with each other in minimal pairs.

[m] and [n]	[maːɽi] (cow)	-	[naːɽi] (country)
[m] and [ɳ]	[aːmɛ] (tortoise)	-	[aːɳɛ] (oath)
[n] and [ɳ]	[manɛ] (a building site)	-	[maɳɛ] (a plank)

8.7.2 [n̪] occurs only in the medial consonant group [n̪d̪], in which phonetic environment no other nasal consonant occurs.

8.7.3 [ŋ] occurs only in the medial consonant group [ŋg] in which phonetic environment no other nasal consonant occurs.

8.7.4 But [ɲ] occurs initially in a few words like [ɲaːnÃ] (wisdom) [ɲaːβəñÃ] (memory) etc., and in the medial consonant group [ɲdʒ]. Since [m] and [n] can also occur in word-initial position followed by a vowel and since [m] and [n] and [ɳ] contrast with each other, we have to recognize at least four phonemes to accommodate the nasals. These are notated /m/, /n/, /ɳ/ and /ɲ/ in this analysis.

Allophones:-

8.7.5	/m/	[m]	/maːmi/	[maːmɪ]	(aunt)
			/umi/	[ʊmɪ]	(husk)
			/kambi/	[kʻambɪ]	(wire)
8.7.6	/n/	[n]	/naɾi/	[naɾɪ]	(fox)
			/pani/	[pʻanɪ]	(dew)
			/t̪eːn/	[t̪ʻeːn]	(honey)

[n̪][9] /onḍre/ [wonḍrɛ] (one and a half)

[n̪̪][10] /paṉḍi/ [p'aṉḍi] (ball)

[ŋ][11] /paṅgi/ [p'aŋgi] (share)

8.7.7 /ɳ/ [ɳ] /maɳi/ [maɳɪ] (bell)

/puɳ/ [p'oɳ] (wound-n.)

8.7.8 /ɲ/ [ɲ] /ɲa:bəhə^{N}/ [ɲa:βəɦ̃ʌ̃] (memory)

/paɲʤi/ [p'aɲʤi] (cotton)

8.7.9 /m/, /n/ and /ɳ/ can all occur geminated in intervocalic position. These are all treated as one phoneme, occurring twice. A few examples are:

/amma:/ [am:a:] (mother)

/panni/ [p'an:ɪ] (pig)

/kaɳɳi/ [k'aɳ:i] (eye)

The vowel preceding these geminated nasals is always short.

8.8 THE FRICATIVES:-

8.8.1 Of the various fricative sounds that occur in the dialect of Tamil under survey, [β] and [ð] have been assigned to the phonemes /b/ and /d̪/ respectively. (see 8.5.3 and 8.5.7)

8.8.2 Of the remaining fricatives under discussion [s, ʂ, z, c, j, h and ɦ], several are in contrastive distribution with several others.

9. [n̪] occurs only in the consonant group [nḍr] and in this phonetic environment no other nasal consonant occurs.
10. [n̪̪] occurs only in the consonant group [n̪̪d], in which phonetic environment no other nasal consonant occurs.
11. [ŋ] occurs only in the consonant group [ŋg], in which phonetic environment no other nasal consonant occurs.

8.8.3 [ɸ] and [s] contrast with each other:-

[ɸaɾɪ] (pour down) [saɾɪ] (a term of approbation meaning 'yes'.)

8.8.4 [ɸ] and [h] contrast with each other:-

[ɸaɾɪ] (pour down) [haɾɪ] (God Vishnu)

8.8.5 [ɸ] and [ɦ] contrast with each other:-

[pʻaɸɛ] (glue-n.) [pʻaɦɛ] (enmity)

8.8.6 [ɸ] and [ʐ] contrast with each other:-

[pʻaɸɪ] (hunger) [pʻaʐɪ] (guilt)

8.8.7 [s] and [h] contrast with each other:-

[saɾɪ] (a term of approbation meaning 'yes'.) [haɾɪ] (God Vishnu)

8.8.8 [ʂ] and [ʐ] contrast with each other:-

[kʻɷʂɪ] (jollity) [kʻɷʐɪ] (pit)

8.8.9 [ʐ] and [ɦ] contrast with each other:-

[moʐÃ] (ell) [moɦÃ] (face)

8.8.10 [h], [ɦ] and [j] are in complementary distribution, [h] occurring only initially, [ɦ] only intervocalically when the following vowel is anything other than [ɪ] and [j] occurring only intervocalically, when the following vowel is [ɪ].

8.8.11 Since [ɸ], [s] and [ʐ] are in contrastive distribution, we must recognize at least three fricative phonemes. Further, since [ʂ], [ʐ] and [ɦ] are also in contrastive distribution, we have to recognize five phonemes to accommodate all the fricatives, which we symbolize /s/, /ɸ/, /ʂ/, /ʐ/ and /h/.

Allophones:-

8.8.12	/s/	[s]	/so:pu/	[so:p•ʊ]	(soap)
			/rasəᴺ/	[rasÃ]	(pepper water)
			/pusṯəhəᴺ/	[p'ʊsṯəɦÃ]	(book)
8.8.13	/c/	[ɕ]	/ɕi:pɨ/	[ɕi:p•ɨ]	(comb-n.)
			/paɕi/	[p'aɕɪ]	(hunger)
8.8.14	/ʂ/	[ʂ]	/ʂa:pɨ/	[ʂa:p•ɨ]	(shop)
			/kaʂṯəᴺ/	[k'aʂṯÃ]	(difficulty)
			/ʋəʂəᴺ/	[ʋəʂÃ]	(poison)
8.8.15	/ʐ/	[ʐ][12]	/paʐi/	[p'aʐɪ]	(guilt)
			/ku:ʐ/[13]	[k'u:ʐ]	(a type of gruel)
8.8.16	/h/	[h]	/ha:rəᴺ/	[ha:rÃ]	(garland)
		[ɦ]	/paɦe/	[p'aɦɛ]	(enmity)
		[j]	/aʐɨhi/	[aʐɨjɪ]	(having become rotten)[14]

8.9 THE LATERALS:-

8.9.1 The alveolar and the retroflex laterals contrast with each other:

[p'ʊlɪ]	(tiger)	[p'ʊɭɪ]	(tamarind)
[k'al]	(stone)	[k'aɭ]	(toddy)

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12. [ʐ] is an approximant in the speech of many, the fricative and approximant varieties of [ʐ] being in free variation.
13. Words with a final [ʐ] may also be pronounced with a final vowel - [k'u:ʐʊ] (a type of gruel).
14. [f] occurs only in two words - [frəɳḍɨ] (friend) and [k'a:fɪ] (coffee) and hence [f] has not been included in the phonemic analysis.

8.9.2 We therefore have to recognize two lateral phonemes.

Allophones:-

8.9.3	/l/	[l]	/la:ɖəᴺ/	[la:ɽ̃ʌ̃]	(horseshoe)
			/ke:li/	[kʻe:lɪ]	(fun)
8.9.4	/ɭ/	[ɭ]	/puɭi/	[pʻʊɭɪ]	(tamarind)
			/kaɭ/	[kʻaɭ]	(toddy) [15]

Both /l/ and /ɭ/ occur geminated intervocalically. The vowel preceding them is always short.

/palli/	[pʻal:ɪ]	(lizard)
/puɭɭi/	[pʻʊɭ:ɪ]	(a dot)

8.10 ROLLED AND FLAPPED SOUNDS:-

8.10.1 [ɽ] has been assigned to the phoneme /ɖ/. (see 8.5.9).

8.10.2 Of [r] and [ɾ], [r] occurs initially. Intervocalically, medially and finally, [r] and [ɾ] are free variants, [ɾ] being the sound more commonly used. (see 7.9.1.1 to 7.9.2.13 and the kymograms 155-164 that accompany these two sections). Hence both [r] and [ɾ] are assigned to one phoneme. This is symbolized /ɾ/ since [ɾ] is the sound more commonly used in speech.

Allophones:-

8.10.3	/ɾ/	[r]	/ɾa:ɳi/	[ra:ɳɪ]	(Queen)
		[ɾ]	/kaɾi/	[kʻaɾɪ] ~ [kʻarɪ]	(curry, charcoal)
			/ɑʋəɾ/	[ɑʋəɾ] ~ [ɑʋər]	(he - honorific)

15. Words with a final [ɭ] are also pronounced with an additional final vowel.

8.11 APPROXIMANTS AND SEMI-VOWELS

8.11.1 There are two approximants [ʋ] and [ɻ]. These contrast with each other in minimal pairs.

[ɑʋɨ] (untie - imp.) - [ɑɻɨ] (weep - imp.)

so these two have to be assigned to different phonemes. [ɻ] also occurs as a fricative (the fricative and approximant varieties being free variants) and the phoneme /ɻ/ has been discussed in 8.8. see 8.8.11 and 8.8.15. Here we set up a /ʋ/ phoneme to accommodate [ʋ].

8.11.2 Allophones:- [ʋ] /ʋɑɻi/ [ʋɑɻɪ] (way)

/ɑʋə/ [ɑʋə] (she)

/ʋ/ also occurs geminated in intervocalic position.

/ʋɑʋʋɑ:l/ [ʋɑʋ:ɑ:l] (bat - the mammal)

8.11.3 The palatal semi vowel [j] occurs initially, medially, intervocalically and finally. [w] occurs only as an initial on-glide to word-initial orthographic o: and o and in no other position. So [w] is not included in the phonemic analysis. We have to recognize a /j/ phoneme.

8.11.4 Allophones:- [j] /jɑ:ne/ [jɑ:nɛ] (elephant)

/ʋɑ:jɖɑ:/ [ʋɑ:jðɑ:] (a time or date fixed).

/majil/ [majɪl] (peacock)

/nɑ:j/ [nɑ:j] (dog)

(Words with a final [j] may also be pronounced with an additional vowel at the end - [nɑ:jɪ] (dog).

/j/ occurs geminated in intervocalic position, as in /ʈajjəl/ [ʈʻaj:əl] (sewing).

8.12 The Tamil Consonants - Phonemic Inventory

p	b	m						
t̪	d̪							
		n		l		s		ɾ
ʈ	ɖ	ɳ		ɭ		ʂ	ʐ	
tʃ	dʒ	ɲ						j
					ɣ			
k	g							
ʋ								h

/b/, /ɖ/, /m/, /n/, /ɳ/, /l/, /ɭ/, /j/ and /ʋ/ occur geminated in intervocalic position. The vowel preceding these geminated consonants is always short.

Chapter IX

Similitude, Assimilation, Elision & Epenthesis.

(Pages 466 - 486)

Chapter IX

9 SIMILITUDE, ASSIMILATION, ELISION AND EPENTHESIS.

9.1 General Remarks:-

9.1.1 The terms "similitude" and "assimilation" have been used differently by different writers on languages.[1] For example, Abercrombie (1967, 87) uses the term "similitude" to refer to the process by which the articulation of one segment in a word is accommodated to the articulation of an adjacent segment. The [k]s in the English words kill and cool are an oft-quoted example. The point of contact for the stop during the articulation of [k] is further forward in the mouth in the English word kill than it is in the English word cool, in the former example the [k] being followed by a front vowel and by a back vowel in the latter example. This accommodation of articulation is an "economizing effort",[2] for with an advanced [k] or a retracted [k] depending upon the succeeding vowels, the tongue travels the minimum distance to reach the posture required for the next segment.

9.1.2 Abercrombie (1967) uses the term "assimilation" to refer to "changes in pronunciation which take place

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1. See Abercrombie (1967, 133) and Jones (1964 - ix ed., 1969 reprint, 219, f.n.2)
2. Abercrombie (1967, 87)

under certain circumstances at the ends and at the beginnings of words (changes at "word-boundaries", that is to say) when these words occur in connected speech, or in compounds".[3] In other words, assimilation deals with changes in word forms, whereas similitude does not entail any such change.

9.1.3 Jones (1964, ix ed., 1969 reprint, 217) says of similitude: "It often happens that a particular sequence of two phonemes involves the use of a subsidiary member of one of them which has a greater resemblance to a neighbouring sound than the principal member has. In this case there is said to be <u>similitude</u> between that subsidiary member and the neighbouring sound". Jones's examples imply that such accommodation between segments need not be confined to single words to be called examples of similitude. Apart from examples like /eitθ/ (a dental [t̪] being used instead of the alveolar [t] because of the succeeding dental consonant), and /əd'hiə/ (a voiced [ɦ] being used instead of the voiceless [h] because it occurs between two voiced sounds), Jones cites the examples of a post-alveolar [t̠] being used instead of an alveolar [t] in /ət rest/ and a dental [n̪] being used instead of an alveolar [n] in the sequences /'wʌn 'θiŋ/ and /ɔn ðə 'graund/. The last three are clearly cases of "changes at word-boundaries", to use Abercrombie's (1967, 133) expression. So, from these

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3. Abercrombie (1967, 133)

examples, we infer that to Jones, similitude would imply an allophonic change, i.e., a subsidiary member of a phoneme being used instead of the normally used principal member under the influence of an adjacent sound, irrespective of whether this allophonic change takes place within a word or at word-boundaries.

9.1.4 Jones (1964, ix ed., 1969 reprint, 217-18) defines assimilation as "the process of replacing a sound by another sound under the influence of a third sound which is near to it in the word or sequence..." All the examples Jones cites as illustrations of assimilation are cases in which phonemic changes take place. Many of Jones' examples of historical assimilation are phonemic changes <u>within words</u> - /oupm/ instead of /oupn/ (<u>open</u>); /hæpm/ instead of /hæpn/ (happen); /witθ/ instead of /widθ/ etc., and all his examples of contextual assimilation are cases involving phonemic changes at word-boundaries. Jones' examples of /ət 'rest/ and /ɔn ðə 'graund/ as cases of similitude and of /witθ/ and /hæpm/ as cases of assimilation makes one infer that to Jones similitude involves allophonic changes either within words or at word-boundaries and assimilation involves phonemic changes, also within words and at word-boundaries.

9.1.5 Gimson (1962, 1969 reprint, 266-67), on the other hand, refers to any variations in articulation, - i.e., allophonic or phonemic - either within words or at word/morpheme boundaries as assimilation. A few of Gimson's

examples of assimilation in English are:-

(1) Allophonic:-

(a) Within words:-

/t/ post alveolar in try (influence of [ɹ])

/k/ advanced (pre-velar) in key (influence of [i:])

/m/ or /n/ labio dental in nymph, infant (influence of [f])

(b) at word-boundaries:-

/t/ dental in not that (influence of [ð])

/n/ or /m/ labio-dental in ten forks, come for me (influence of [f])

(2) Phonemic:-

(a) Within words:-

length may be /leŋθ/, /leŋkθ/ or /lenθ/.

disgrace may have /s/ or /z/ in the first syllable.

absolutely may have final /p/ or /b/ in the first syllable.[4]

9.1.6 Gimson points out at the same time that "in the contemporary language it is at word boundaries in connected speech that most cases of phonemic changes occur..." [5] The examples that he cites of phonemic change within a word, a few of which are given above, are cases in which "different pronunciations of the same word (either between two speakers or between two styles of speech in the same speaker) sometimes exhibit a different choice of internal phoneme depending on the

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4. Just a few of Gimson's examples are cited here.
5. Gimson (1962, 1969 ed., 269)

degree of assimilatory pressure of the word environment felt by the speaker". [6]

9.1.7 We have thus three points of view:-

(a) Similitude - allophonic change within a word;
assimilation - change at word-boundaries
(Abercrombie)

(b) Similitude - allophonic changes within words and at word-boundaries
assimilation - phonemic changes, within words and at word-boundaries.
(Daniel Jones)

(c) assimilation - any change (allophonic or phonemic) within a word and at word-boundaries.
(Gimson)

9.1.8 It is the first view that is taken into account for this analysis here. The term "similitude" in this account refers to an allophonic change within a word and the term "assimilation" to any change (allophonic or phonemic) at word boundaries.

9.2 SIMILITUDE:-

9.2.1 In the colloquial dialect of Tamil under survey, a number of examples of similitude occur.

(a) An advanced variety of /ʈ/ occurs when a front vowel follows it. e.g.,
/pa:ʈi/ - [pʻa:ʈʻɪ] - (grandmother)[7]

6. Gimson (1962, 1969 ed., 269)
7. Both phonemic and phonetic transcriptions are given in the case of all these examples.

(b) a retracted variety of /ʈ/ occurs when a back vowel follows it. e.g.,

/puːʈu/ [pʻuːʈˑo] (lock-n.)

(c) a "neutral" variety of /ʈ/ is used when a central vowel follows it. e.g.,

/paʈɨ/ [pʻaʈːɨ] (silk) [8]

(d) an advanced variety of /k/ is used when a front vowel follows it. e.g.,

/kiːʈ̟ɨ/ [kʻiːʈ̟ˑɨ] (thatch-n.)

(e) a retracted variety of /k/ is used when a back vowel follows it. e.g.,

/kuːʈ̠u/ [kʻuːʈ̠ˑo] (a wild type of dance)

(f) a "neutral" variety of /k/ is used when a central vowel follows it. e.g.,

/kɨːʐe/ [kʻɨːʐɛ] (down, below) [9]

(g) a post-alveolar variety of /ʈ/ is used when it is followed by [ɾ] ~ [r].[10] e.g.,

/oʈɾe/ [woʈ̠ɾɛ] (cobweb)

/oːʈɾe/ [woʈ̠ɾɛ] (you are driving)

(h) a laterally exploded /ʈ/ is used when it is followed by [l]. e.g.,

/poʈlən/ [pʻoʈˡlə̃] (packet)

/piʈle/ [pʻɪ ʈˡlɛ] (a type of curry)

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8. Also see chapter VII, where these are discussed in detail. See palatograms 27, 28 and 29 in chapter VII.
9. See chapter VII, palatograms 39, 40 and 41. Similar advanced, retracted and "neutral" varieties of consonants are discussed in detail in chapter VII.
10. [ɾ] and [r] are free variants. See 7.9.2.3 to 7.9.2.13.

(i) a nasally exploded /ʈ/ is used when it is followed by [ɳ]. e.g.,

/ʧ ɑʈɳi/ [ʧ ɑtᴺɳ] (chutney) [11]

(j) a nasally exploded /p/ is used when it is followed by [m]. e.g.,

/upmɑ:/ [ɷpᴺmɑ:] (a savoury made with semolina) [12]

(k) a post alveolar /ɖ/ is used when it is followed by [ɾ] - [r]. e.g.,

/o:ɖɾɑ:/ [wo:d̲ɾɑ:] (she is running).

(l) a dental /n/ is used when it is followed by /d̪/ e.g.,

/pɑndɨ/ [pʻɑn̪d̪ɨ] (ball) [13]

(m) a partially lengthened /p/ is used intervocalically when the vowel preceding it is long and a fully lengthened /p/ is used when the vowel preceding it is short. e.g.,

/upu/ [ɷp:ɷ] (salt)

/kɑ:pɨ/ [kʻɑ:p·ɨ] (a type of bangle)[14]

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11. See kymogram 126 in chapter VII.
12. See kymogram 99 in chapter VI.
13. See palatograms 65, 66 and 67 in chapter VII.
14. The length of the other voiceless stop consonants depends upon the length of the vowel preceding them in words. See chapter V. Also see kymograms 69 and 70, 75 and 76, 80 and 81, and 85 and 87 in chapter V.

(n) Lip-spread and lip-rounded consonants are used in speech, depending upon the immediately following vowel being spread or rounded. A couple of examples are cited below:

	lip-spread		lip-rounded	
/p/	[pʻi:t̪ʻəl]	(rags)	[pʻu:]	(flower)
/ʈ/	[pʻɑ:ʈʻɪ]	(grandmother)	[pʻu:ʈʻo]	(lock-n.)
/ɳ/	[maɳ:ɨ]	(mud)	[pʻoɳ:o]	(girl)
/ʐ/	[pʻɑʐɪ]	(guilt)	[pʻoʐo]	(worm) [15]

9.3 ASSIMILATION:-

9.3.1 In this analysis, "assimilation" is the term used to refer to the process by which a sound is replaced by another sound (the replaced sound may be an allophone of the phoneme to which the sound that replaces it belongs or the two sounds may belong to two different phonemes) at a word and/or morpheme boundary. The only type of assimilation discussed here is juxtapositional or contextual assimilation. In the colloquial dialect of Tamil under survey there are examples of regressive and progressive assimilation. The three types of assimilation mentioned by Abercrombie (1967, 135) are recognized in this analysis. They are:-

(a) those involving the state of the glottis

(b) those involving velic action

(c) those involving movement of the articulators

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15. Similar to the examples given above, we get lip-spread and lip-rounded varieties of the other consonants. See labiograms 15-48 in chapter VII.

In each of these cases, possible regressive and progressive assimilatory processes are examined.

(a) Assimilation involving the state of the glottis:-

9.3.2 In compound words or in two words pronounced together in connected speech, it is possible that the last segment of the first word and the first segment of the second word will involve different states of the glottis. One may be voiced and the other voiceless. To avoid the necessity of the vocal cords vibrating during the articulation of one segment and being held apart during the articulation of the next segment or vice versa, both the segments are made voiced or voiceless.

9.3.3 (i) regressive assimilation:-

In the dialect of Tamil under survey, invariably the voiceless segment becomes voiced. There are no examples of regressive assimilation involving the states of the glottis because native Tamil words do not end in a voiceless consonant at all and Tamil speakers add an epenthetic vowel to the final voiceless segment of the loan words that they use freely in speech.

9.3.4 (ii) Progressive assimilation:-

[aɲdʒɨ pʻaʈ:ɨ] is pronounced [aɲdʒiβaʈ:ɨ] [16] (ten past five)

[kʻa:ɲdʒɨ pʻo:t̪ʃo] is pronounced) [kʻa:ɲdʒɨβo:t̪ʃo] (it has dried up)

[kʻaɲdʒɪ ʈʻarɛ̃] is pronounced [kʻaɲdʒɪðarɛ̃] (I'll give you some gruel)

16. The [pʻ] of the second word is replaced by [β] in connected speech because in Tamil no voiced stop consonant ever occurs intervocalically.

[p'ɛɾɪjə p'oʈ:ɪ] is pronounced [p'ɛɾɪjəβoʈ:ɪ] (big box)

[ɑʋə t̪'ɑ̃:] is pronounced [ɑʋəðɑ̃:] (It is she herself)

[k'ɑɳ t̪'ɛɾɪjɑ:ðɨ] is pronounced [k'ɑɳd̪ɛɾɪjɑ:ðɨ] (someone can't see)

[k'ɑɳdʒɪ k'ωɽɪ] is pronounced [k'ɑɳdʒɪɦωɽɪ] (drink some gruel)

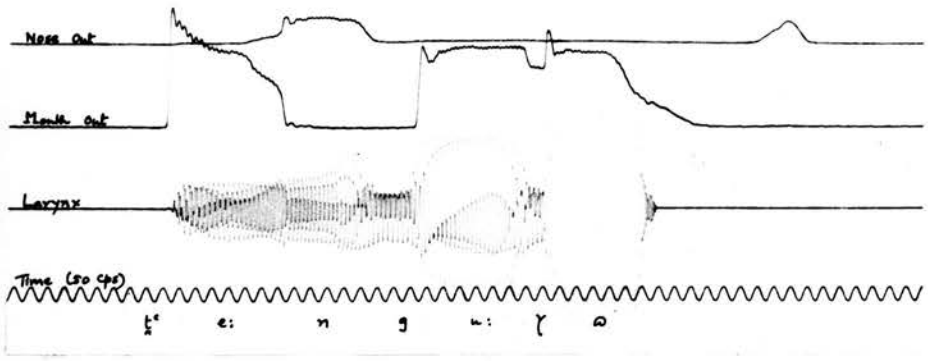
[p'on k'ωɽωk'əɳm̃] is pronounced [p'ongωɽωk'əɳm̃] (I must give some gold)

[p'oɳ p'ɑ:k'ə ʋɑɳd̪ɑ̃:] is pronounced [p'oɳbɑ:k'ə ʋɑn̪d̪ɑ̃:] (he came to see the girl)

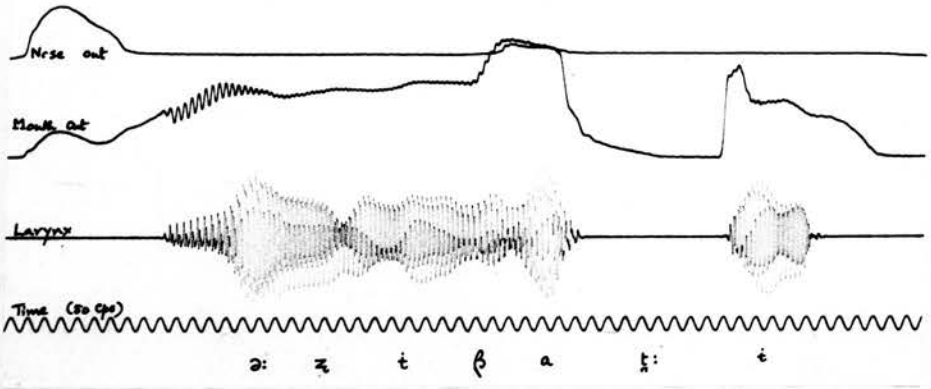
9.3.5 A few kymograms are reproduced on the next few pages to illustrate this phenomenon. The individual words forming the compound/phrase in connected speech are given in phonetic transcription and the compound/phrase in connected speech is also given in phonetic transcription to point out the segments involved in the assimilatory process.

9.3.6 (b) Assimilation involving velic action:-

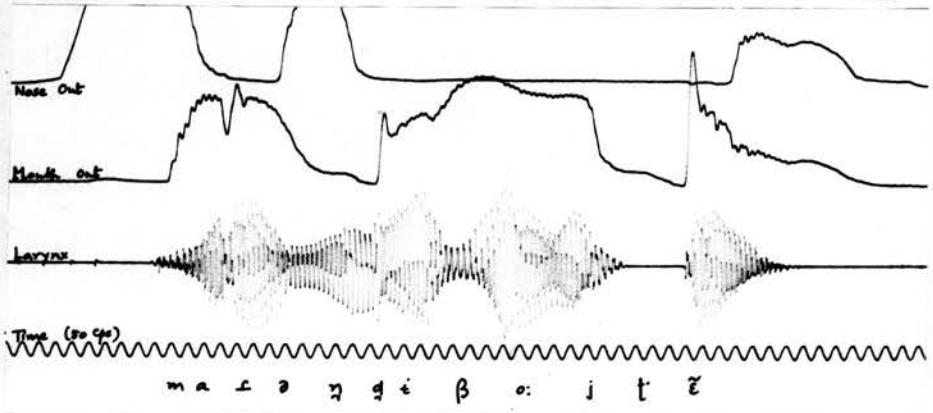
If two words, one ending in a nasalized vowel and the next beginning with a non-nasal consonant, form a compound and are therefore to be pronounced without a pause between them, two movements of the velum are required in articulating them. But it may happen that one of these velic actions is eliminated in speech by either making both the segments nasal or by making both the segments non-nasal. In the colloquial dialect of Tamil under survey this type of assimilation is always regressive, i.e., the nasal vowel of the first of the



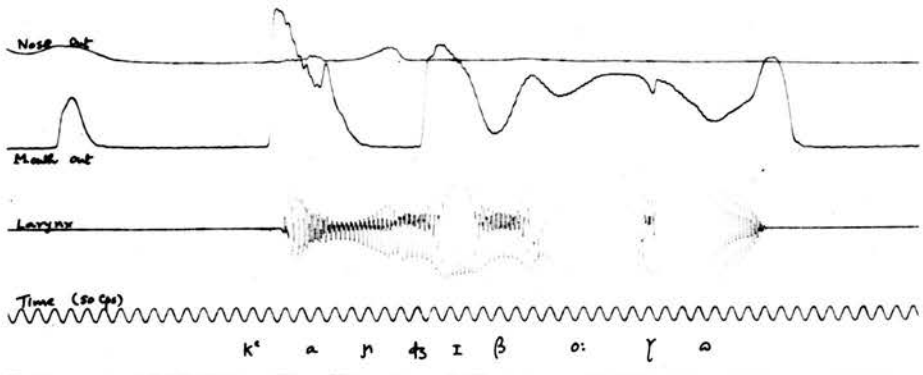
Kgm. 165
[t̪ʰe:n] + [kʰu:ɣɷ] = [t̪ʰe:ngu:ɣɷ] (beehive)



Kgm. 166
[ɔ:ɳ̊t̪] + [pʰat̪:t̪] = [ɔ:ɳ̊t̪βat̪·t̪] (ten past seven)

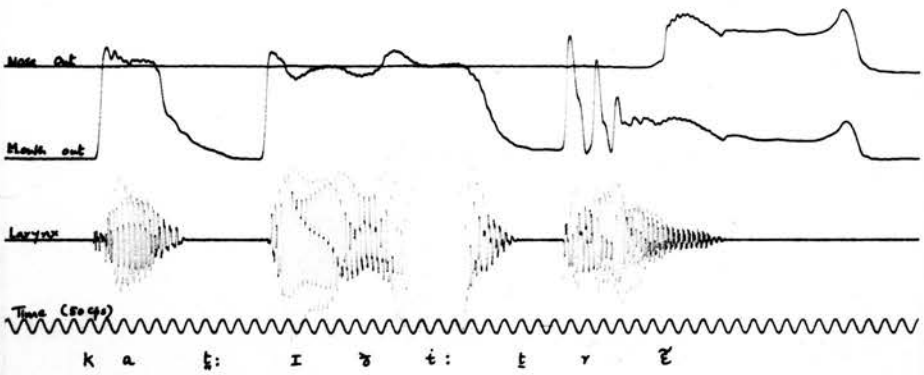


Kgm. 167
[maɾɔŋɖ̥t̪] + [pʰo:jt̪̆] = [maɾɔŋɖ̥t̪βo:jt̪̆] (I forgot)



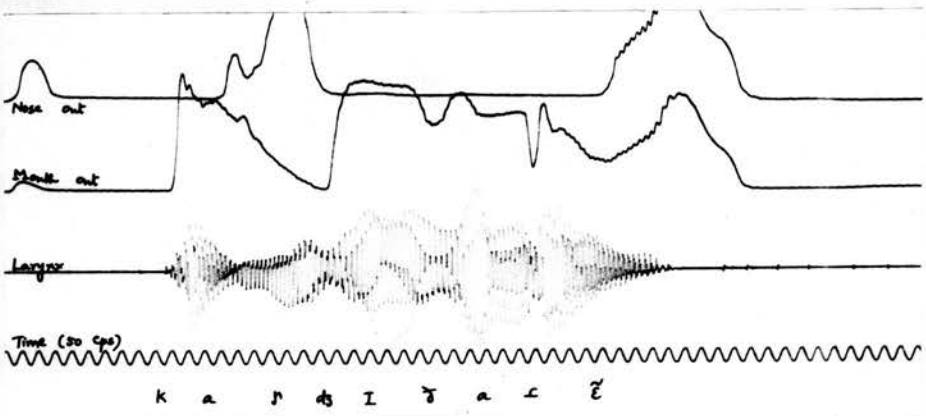
Kgm. 168

[k'aɲʤɪ] + [p'o:ɣə] = [k'aɲʤɪβo:ɣə] (prepare some gruel)



Kgm. 169

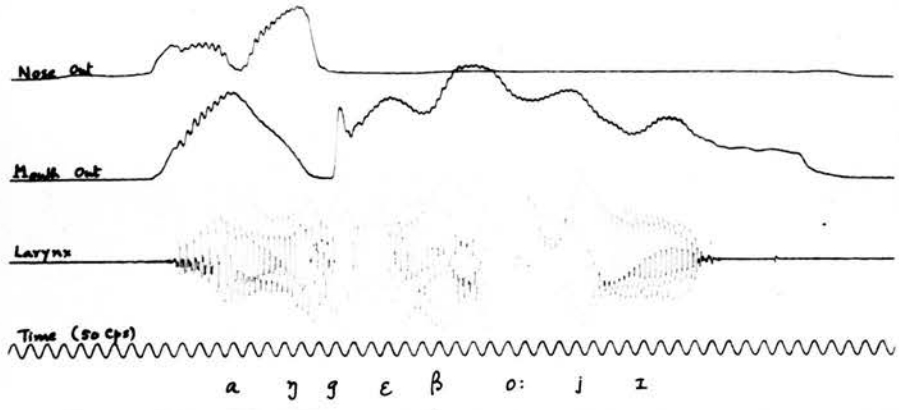
[k'aʧ:ɪ] + [ʧ'ɜ:ʧɾɛ̃] = [k'aʧːɪɜ:ʧɾɛ̃] (I'm sharpening the knife)



Kgm. 170

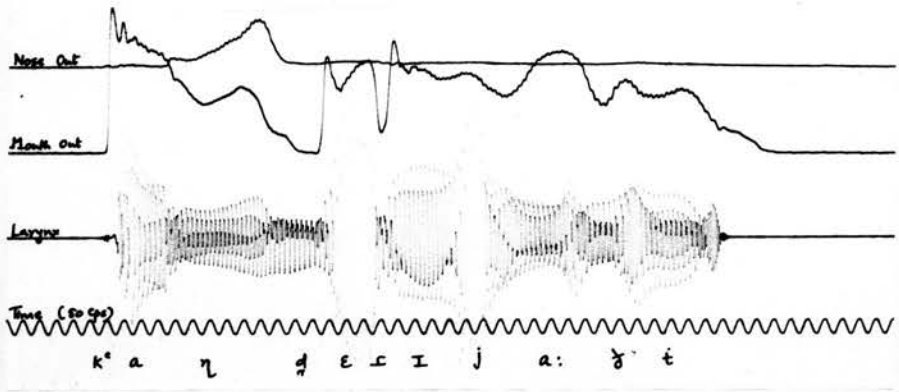
[k'aɲʤɪ] + [ʧ'aɾɛ̃] = [k'aɲʤɪɜaɾɛ̃] (I'll give you some gruel)

ASSIMILATION



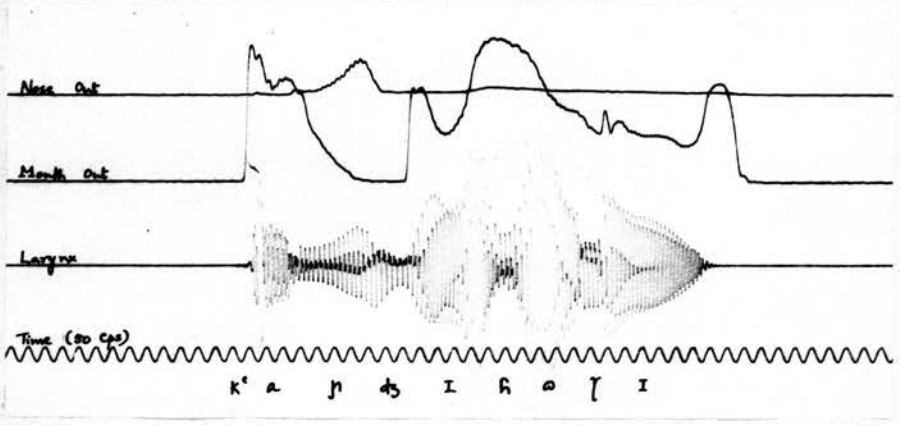
Kgm. 171

[aŋgɛ] + [pʿo:jɪ] = [aŋgɛβo:jɪ] (having gone there)



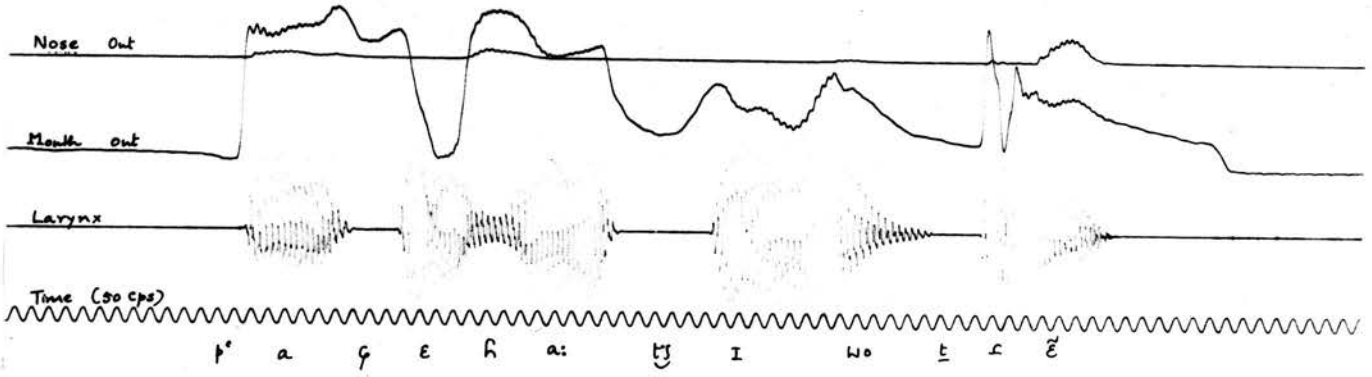
Kgm. 172

[kʿaŋ] + [ʈʿɛɾɪjaːɣt] = [kʿaŋɖɛɾɪjaːɣt] (Someone can't see)



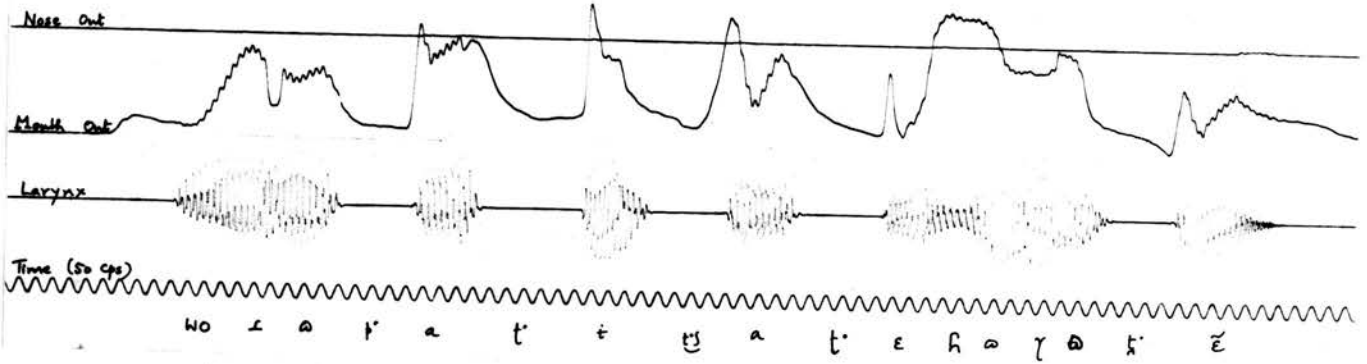
Kgm. 173

[kʿaɲʤɪ] + [kʿɷɣɪ] = [kʿaɲʤɪɦɷɣɪ] (Drink some gruel)



Kgm. 174

[pʼaɕɛ] + [kʼaːtʲɪ] + [wot̪ɾɛ̃] = [pʼaɕɛɦaːtʲɪ wot̪ɾɛ̃] (I have made some glue and I am pasting something



Kgm. 175

[woɾɔ] + [pʼaʈːɨ] + [ɕaʈːɛ] + [kʼaɣɔʈʂɛ] = [woɾɑ pʼaʈːɨtʲaʈːɛɦaɣɑɮɛ̃]

(I gave someone a silk shirt)

two words forming the compound loses its nasality.

A few examples are cited below:-

[ni:lɑ̃] + [kaleɾ] = [ni:lək'aleɾ] (blue-coloured)

[k'o:lɑ̃] + [p'oɽɪ] = [k'o:lep'oɽɪ] (a powder used in decorating floors)

[ma:nɑ̃] + [k'e:ɽɨ] = [ma:nek'e:ɽɨ] (shameful)

[nɨ:lɑ̃] + [k'aɳ:a:ɽɪ] = [nɨ:lək'aɳ:a:ɽɪ] (a long glass)

[ba:ɾɑ̃] + [ʋaɳɖɪ] = [ba:ɾeʋaɳɖɪ] (a cart for heavy loads)

[t̪'a:lɑ̃] + [ʋa:d̪jɑ̃] = [t̪'a:ləʋa:d̪jɑ̃] (any percussion instrument)

9.3.7 Progressive assimilation involving velic action:-

There are, to the present writer's knowledge, no examples of this type of assimilation in his colloquial dialect of Tamil.

(c) Assimilation involving the articulators:-

9.3.8 (i) Regressive:-

Let us consider the following examples:

[jɛn] (my)

[jɛn] + [p'ɔst̪əɱɑ̃] = [jɛmbɔst̪əɱɑ̃] (my book)

[jɛn] + [t̪'aŋgɛ] = [jɛn̪d̪aŋgɛ] (my younger sister)

[jɛn] + [kat̪:ɪ] = [jɛŋgat̪:ɪ] (my knife)

[jɛn] + [ɕat̪:ɛ] = [jɛnʤat̪:ɛ] (my shirt)

9.3.9 In the above examples, the two words that are pronounced together in connected speech involve different articulators at the word-boundaries. In the first case, they are alveolar + bilabial, in the second, alveolar + dental, in the third, alveolar + velar and in the fourth, alveolar + palatal. In

connected speech, the last segment of the first word, which is alveolar, is replaced by another segment which involves the same articulators as the immediately following first segment of the second word. As a result of this regressive assimilation both the segments (last segment of the first word and the first segment of the second word) are bilabial in the first example cited, dental in the second, velar in the third and palato-alveolar in the fourth. It should be pointed out, however, that along with this regressive assimilation involving the articulators, progressive assimilation involving the state of the glottis is in operation as well. The nasals are voiced and hence the voiceless word-initial segment in the second of the two words in each case is replaced by voiced ones.

9.3.10 Many more examples of this type of assimilation are discussed under the heading "epenthesis". In the present writer's colloquial dialect word-final nasal consonants are very rare. Words which have a final V + N in the orthography have a final nasalized vowel in his colloquial dialect. In pronouncing a word with a final nasalized vowel and another word with an initial voiceless (oral) consonant together in connected speech, a nasal consonant is introduced between the two words and it is homorganic with the immediately following first segment of the second word.

9.3.11 Progressive assimilation involving the articulators:-

To the present writer's knowledge, there are no examples of this type of assimilation in his colloquial dialect.

9.4 ELISION:-

9.4.1 Jones (1964, ix ed., 1969 reprint, 230) defines elision thus: "Elision is defined as the disappearance of a sound. There are historical elisions, where a sound which existed in an earlier form of a word was omitted in a later form; and there are contextual elisions, in which a sound which exists in a word said by itself is dropped in a compound or in a connected phrase".

9.4.2 A few examples of elision in the colloquial dialect of Tamil under survey can be quoted.[17] The words are given in phonetic transcription as they are pronounced in isolation. Then the compound or connected phrase is transcribed phonetically.

[k'o:ɳəl] + [p'ajə]	[k'o:ɳəp·ajə] (crooked fellow)
[k'oɳɖɷ] + [ʋa:]	[k'oɳɖa:] (bring - imp.)
[k'oɳɖɷ] + [ʋaɾɛ̃]	[k'oɳdɾɛ̃] (I'm bringing)
[k'a:l] + [ba:ɦÃ]	[k'a:βa:ɦÃ] (a quarter of something)
[k'oj:a:] + [k'a:j]	[k'oj:a:k·a:] (unripe guava)
[rəɳɖɨ] + [ʋa:j] + [ɸa:pɽɨ]	[rəɳɖɨ ʋa: ɸa:pɽɨ] (eat two morsels of food)

17. Only contextual elisions are taken into account here.

9.4.3 Many words which end in [l], [ɭ], [n], [ɳ], [ɾ], and [ɻ] are pronounced with an additional vowel at the end, making up an extra syllable. This pronunciation occurs in free variation with the pronunciation of such words without an extra vowel. When such a word is pronounced together with another word in a compound or a connected phrase, this extra vowel is elided. A few examples are given below.

Colloquial Tamil - word in isolation	gloss	Colloquial Tamil Compound or connected speech	gloss
[mi:n] ~ [mi:ni]	(fish)	[mi:n nan:a:l:ɛ]	(fish is no good)
[p'al] ~ [p'al:i]	(tooth)	[p'al t̪'e:j]	(brush your teeth)
[nu:l] ~ [nu:lo]	(thread)	[nu:l k'aɳɖi]	(a ball of thread)
[mo:ɾ] ~ [mo:ɾo]	(buttermilk)	[mo:ɾʱoɽɪ]	(drink some buttermilk)
[t̪'ə:ɭ] ~ [t̪'ə:ɭi]	(scorpion)	[t̪'ə:ɭ k'oɽ'ɪ t̪'i]	(a scorpion stung me)
[p'a:l] ~ [p'a:li]	(milk)	[p'a:l p'a:jəsÃ]	(milk pudding)
[k'a:l] ~ [k'a:li]	(leg)	[k'a:lᵛalɪ]	(pain in the leg)
[moɭ] ~ [moɭ:o]	(thorn)	[moɭ p'oðəɾ]	(a shrub of thorns)
[k'aɳ] ~ [k'aɳ:i]	(eye)	[k'aɳdɛɾɪja:ði]	(someone cannot see)
[maɳ] ~ [maɳ:i]	(mud)	[maɳba:nɛ]	(mud pot)

9.4.4 Verbs which end in [ɾ] and [ɻ] in formal Tamil are invariably pronounced with an extra vowel at the end in colloquial Tamil. For example, formal Tamil

[pʻaːɾ] (see - imp.) and [kʻəːɻ] (hear - imp.) are [pʻaːɾɨ] and [kʻəːɻɨ] respectively in colloquial Tamil. The extra vowel (and therefore the extra syllable) is retained in compound words or in connected speech - e.g., [ɪðɛpʻaːɾɨ] (see this); [aðɛkʻəːɻɨ] (listen to that). This is probably because verbs in Tamil are placed at the very end of sentences. Having nothing to follow them, these are pronounced in connected speech as they are pronounced in isolation.

9.5 EPENTHESIS:-

9.5.1 In pronouncing certain compound words and/or connected phrases, a segment may be added at the word-boundaries. That is, a segment may be added between the two words forming the compound (or which are pronounced together in connected speech), which is not present when the words are uttered in isolation. A few examples of this are given below.

[maː] + [kaːj] [maːŋgaː]
(mango) (unripe fruit)

[maː] + [pʻaɻ̃ʌ̃] (ripe fruit) [maːmbaɻ̃ʌ̃][18]

[avʌ̃] (he)

[avʌ̃] + [pʻoːvʌ̃] [avəmboːvʌ̃] (he will go)

[avʌ̃] + [t̪ʻaŋgɛ] [avənd̪aŋgɛ] (his younger sister)

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18. Even the orthography marks the epenthetic consonants.

[aʊÃ] + [kʻəːtʻãː] [aʊəŋgəːtʻãː] (he asked)

[aʊÃ] + [ɸonːãː] [aʊəndʒonːãː] (he said)

[nãː] (I)

[nãː] + [pʻaːt̪ʻɛ̃] [naːmbaːt̪ʻɛ̃] (I saw)

[nãː] + [t̪ʻãː] [naːn̪d̪ãː] (I myself)

[nãː] + [kat̪ɾɛ̃] [naːŋgat̪ɾɛ̃] (I will tie)

[nãː] + [ɸonːɛ̃] [naːndʒonːɛ̃] (I said)

[kʻaːjðÃ] (letter, a sheet of paper)

[kʻaːjðÃ] + [pʻoːɽɔ] [kʻaːjðəmboːɽɔ] (drop a letter)

[kʻaːjðÃ] + [t̪ʻaɾɛ̃] [kʻaːjðən̪d̪aɾɛ̃] (I will give (you) a sheet of paper)

[kʻaːjðÃ] + [kʻoɳɖaː] [kʻaːjðəŋgoɳɖaː] (bring some paper)

9.5.2 In every one of these cases the nasal consonant that is added is homorganic with the word-initial segment of the second word. The word-initial voiceless segment of the second word is replaced by a voiced sound in the connected phrase - progressive assimilation involving the state of the glottis, regressive assimilation involving the articulators and epenthesis are in operation in these examples.

Chapter X

The Syllables and their structure.

(pages 487 - 502)

Chapter X

10 THE SYLLABLES AND THEIR STRUCTURE.

10.1 General Remarks:-

10.1.1 A syllable at the phonetic level of analysis is taken to be a subjectively delimited entity in the speech stream. Fry (1964, 215-221) says that the syllable is "concerned with the time scheme of speech". In the course of this account, no attempt is made to equate a syllable with a chest pulse in the manner of Stetson (1928 and 1945) though it "is probably the best in so far as it accounts for most of the facts..." [1] The inadequacy of Stetson's theory has been pointed out by Ladefoged, Draper and Whitteridge (1958, 1-14).

10.1.2 As there are at the moment no instrumental means to isolate the syllable, the present writer has depended entirely upon his kinaesthetic sense and his native speaker's intuition to isolate the syllables in Tamil. In this study the syllable is taken to be the "smallest phonetic group" [2] In the words of Ladefoged (1967, 48-50), "...although there is no single muscular gesture marking each syllable, we still need a physiological unit of this size to account for the timing and co-ordination of the

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1. Abercrombie (1967, 34)
2. Brosnahan and Malmberg (1970, 140)

articulatory movements. There is evidence that speakers organize the sequences of complex muscular events that make up utterances in terms of a hierarchy of units, one of which is the size of a syllable and it is certainly true that speakers know how many syllables there are in an utterance". [3]

10.1.3 The syllable in Tamil can be analysed into its components and one comes across three such components making up a syllable. They are:

(a) the initiating component

(b) the nucleus

(c) the checking or arresting component

This three-fold division of a syllable into its components does not mean that every syllable must have these three components. There are syllables in which either the initiating component or the arresting component or both may be absent. But every syllable has the second of the three components mentioned above, namely the nucleus. The nucleus is always what is generally called a vowel and the initiating and arresting components are what are generally called consonants. Thus a syllable which has all the three components can be symbolized CVC, one which has the initiating component and the nucleus can be symbolized CVO, one which has the nucleus and the arresting component OVC and one which has only the nucleus OVO.[4] The syllables of the type CVO and

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3. Ladefoged (1967, 48-50)
4. See Abercrombie (1967, 40-41)

OVO are called open syllables and these of the type CVC and OVC are called closed syllables. Thus

/i:/ (fly) is an open syllable of the type OVO

/pu:/ (flower) is an open syllable of the type CVO

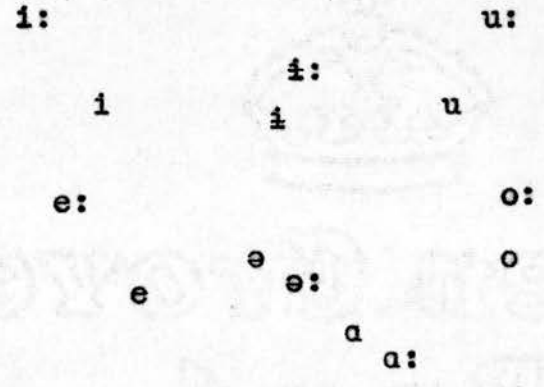
/ɑm-mɑ:/ (mother) - the first syllable is a closed syllable of the type OVC

/pɑ:l/ (milk) is a closed syllable of the type CVC.

10.2 The structure of the syllables in Tamil:-

10.2.1 In the following pages the structure of the Tamil syllables is briefly analysed. To make the study convenient, the phonemic inventories of the Tamil vowels and consonants given in 8.3.4 and 8.12 respectively are reproduced below:

10.2.2 **Vowels**



There is a phoneme of nasalization, symbolized /V^{N}/, /V/ being any oral vowel.

The diphthongs [ɑi] and [ɑɷ] are taken to be a cluster of two vowel phonemes, /ɑ/ and /i/ in the case of [ɑi] and /ɑ/ and /u/ in the case of [ɑɷ].

10.2.3 Consonants:-

p	b	m				
t̪	d̪					
		n	l	s	ɾ	
ʈ	ɖ	ɳ	ɭ	ʂ	ʐ	
ʧ	ʤ	ɲ				j
				ɕ		
k	g					
ʋ						h

10.3 Monosyllabic words:-

10.3.1 Structure V [5]

/i:/ (fly) is the only example of a meaningful word. In addition, there is /a:/ which is an interjection expressing pain.

10.3.2 CV

/po:/ (go - imp.)

/ʈi:/ (tea)

5. In this analysis V is a vowel phoneme and C a consonant phoneme.

/tʃi:/ (fie!)

/ɲi:/ (you)

/ɸi:/ (pus)

/βa:/ (come)

/ɲa:ᴺ/ (I)

10.3.3 Notes:-

(i) the C can be any voiceless stop.

(ii) voiced stops do not occur in monosyllabic words of the structure CV

(iii) the C can be /tʃ/, but /dʒ/ does not occur

(iv) the C can be a nasal but never /ŋ/.

(v) the C is only /c/ if it is a fricative

(vi) no approximant - central or lateral - occurs as the initial C of a monosyllabic word.

(vii) /j/ and /ɾ/ do not occur in the position of C in monosyllabic words.

(viii) the V is invariably one of the long vowel phonemes, but not /ə:/ and /ɨ:/

(ix) any one of the 24 phonemes can be the C in alphabet recitation.

10.3.4 CVV

/mai/ (collyrium)

/kai/ (hand)

/pai/ (bag)

/t̪ai/ (name of a month)

10.3.5 Notes:-

(1) the C can be a nasal or a voiceless stop but

the only example that comes to one's mind with a nasal as the initial C is /mai/.

(2) The one nasal that can never occur as C in syllables of the structure CVV is /ɳ/.

(3) There are no examples of /a/ and /u/ being the VV elements except in alphabet recitation.

(4) The first element of the V is always /a/ and the second element always /i/.

10.3.6 VC There are no examples of monosyllabic words of the structure VC in the colloquial dialect of Tamil under survey. There are words like /u:ɾ/ (town), /i:ɾ/ (young one of a louse) in formal Tamil, but these words in colloquial speech are always /u:ɾu/ and /i:ɾi/ with a final vowel. The VC version of these words does not even occur as a free variant.

10.3.7 CVC

/pa:l/	(milk)
/mi:n/	(fish)
/kaɭ/	(toddy)
/ɸi:ɾ/	(dowry)
/mo:ɾ/	(buttermilk)
/bas/	(bus)
/ku:ʐ/	(a type of gruel)

10.3.8 Notes:-

(1) The initial C is any stop, any nasal except /ɳ/. No examples with an initial /ɲ/ occur to one's mind.

(2) The only fricative that occurs in initial C position is /ɕ/

(3) The final C element can be either of the lateral approximants /l/ and /ɭ/ or the alveolar tap /ɾ/ or /s/ or /z/

(4) Any of the fourteen oral vowels can form the V element.

(All these words may also be pronounced as disyllabic of the structure CV-CV or CVC-CV with an additional vowel at the end. The final consonant is lengthened in the process if the vowel preceding it is short).

10.3.9 CCVC

/pɭe:n/ (aeroplane)

/gɾa:m/ (gramme - metric weight)

/kɭa:s/ (class)

/gɭa:s/ (glass)

10.3.10 Notes:-

(1) The initial CC is always a stop + approximant cluster.

(2) The V is invariably one of the long vowel phonemes.

(The last two words may also be pronounced disyllabic of the structure CCV-CV with an additional vowel at the end).

10.3.11 CVCC

The only example that comes to one's mind is /ɾask/ (rusk) which may also be pronounced /ɾaskɨ/

10.3.12 CCCVC

The only example that one can think of is /skɾi:n/ (screen).

10.4 POLYSYLLABIC WORDS:-

10.4.1 The structure of the initial syllable.

10.4.1.1 V

/u:-me/ [6]	(dumb person)
/a:-me/	(tortoise)
/a:-ɖɨ/	(goat)
/a-ʐə-hɨ/	(beauty)
/i:-ɾəᴺ/	(wetness)
/ə:-ʐɨ/	(seven)
/a-ʋə-nam-bi-ke/	(disbelief)

10.4.1.2 Notes:-

(1) The V can be any vowel.

10.4.1.3 VV

/ai-jəɾ/	(a brahmin)
/ai-nu:-ɾu/	(five hundred)
/au-ʋe/	(name of a person)
/au-ʂə-d̪əᴺ/	(medicine)

The VV is always a cluster of /a/ and /i/ or /a/ and /u/.

6. The hyphen marks the syllable boundaries.

10.4.1.4 VC

/aɳ-ɳa:/	(elder brother)
/am-ma:/	(mother)
/a:s-paṯ-ɾi/	(hospital)
/am-ba-ʈəᴺ/	(barber)
/in-ni-ki/	(to-day)
/an-ja:-jəᴺ/	(unjust)
/al-li/	(a flower)
/aɭ-ɭɨ/	(gather - imp.)
/ap-ɭa:ᴺ/	(pappadams)
/ak-ɾə-məᴺ/	(unjust)
/a:ṯ-ɾəᴺ/	(anger)
/aɾ-ʈəᴺ/	(meaning)

10.4.1.5 Notes:-

(1) The V can be any vowel.

(2) The C can be any stop, any nasal - though one can't think of an example with /ɲ/ as the C element - or either of the lateral approximants. The only fricative that occurs seems to be /s/.

10.4.1.6 CV

/ja:-ne/	(elephant)
/pa:-ne/	(pot)
/ba:-ɾəᴺ/	(weight)
/ɖa-ma:-ɾəᴺ/	(a percussion instrument)
/ma-ɳi/	(bell)
/na-ɾi/	(fox)
/ʋa-ʐi/	(way)

/la:-ɖəᴺ/	(horseshoe)
/sa-ɾi/	(O.K., yes)
/ɕa-ɾi/	(to pour down)
/ʂa:-pɨ/	(shop)
/ɲa:-bə-həᴺ/	(memory)
/ʤa-mi:n-ɖa:ɾ/	(landlord)
/ɦa:-ɾəᴺ/	(garland)
/ɾa:-ʤa:/	(king)

10.4.1.7 Notes:-

(1) The C can be any consonant other than /ɭ/, /ɳ/ and /ʐ/.

(2) The V can be any of the fourteen vowels.

10.4.1.8 CVV

/pai-jəᴺ/	(boy)
/gau-ʈə-məᴺ/	(a proper name)
/mai-ku:-ɖu/	(a container for collyrium)

10.4.1.9 CVC

/pan-ni/	(pig)
/maɳ-ɳɨ/	(mud)
/laɖ-ɖu/	(a sweetmeat)
/kam-bi/	(wire)
/ɕaɳ-ɖe/	(fight-n.)
/sa:m-ba:ɾ/	(a type of soup)
/ʧan-dɾəᴺ/	(moon)
/ɖam-bəᴺ/	(pomp)
/ʤam-bəᴺ/	(pride)
/go:n-ɖu/	(glue-n.)

/ɦam-bi-ke/	(belief)
/ʋa:ʐ-ke/	(life)
/ɦa:ɾ-liks/	(horlicks)
/ɾam-bəᴺ/	(saw-n.)
/pal-li/	(lizard)
/puɭ-ɭi/	(dot)
/ʋa -ʋa:l/	(bat - the mammal)
/tʃ aʈ-ɳi/	(chutney)
/paɲ-dʒɨ/	(cotton)
/ku:p-ɖɨ/	(summon - imp.)
/ka:ɾ-t̪a:-le/	(in the morning)

10.4.1.10 Notes:-

(1) The initial C can be anything except /ɳ/, /ɭ/ and /ʐ/ - one can't think of an example with /ɲ/.

(2) The V can be any vowel.

(3) The final C can be any stop, any approximant - central and lateral - any nasal and /ɾ/.

(4) No fricative seems to occur as the final C element.

10.4.1.11 CVVC

/paur-ɳə-mi/	(full-moon day)
/d̪air-jəᴺ/	(bravery)

10.4.1.12 CCV

/gra:-məᴺ/	(village)
/pra:-ɳi/	(any living being)
/d̪ja:-nəᴺ/	(meditation)

/njɑ:-jəᴺ/ (justice)

/ʋjɑ:-bɑ:-ɾəᴺ/ (business)

/t̪jɑ:-həᴺ/ (sacrifice)

/t̪ɾɑ:-ɳi/ (strength)

/ɖɾɑ:-mɑ:/ (drama)

/pɾə-jɑ:-ɳəᴺ/ (journey)

10.4.1.13 Notes:-

(1) The initial C of the cluster is a stop or /ʋ/ or /n/.

(2) The second element of the consonant cluster is always /j/ or /ɾ/.

(3) The vowel is invariably /ɑ:/ or /ə/.

10.4.1.14 CCVC

/kɾɑ:m-bɨ/ (cloves)

/bɾɑ:n-d̪i/ (brandy)

10.4.1.15 Notes:-

(1) The CC is always a cluster of a stop consonant and /ɾ/.

(2) The final nasal is always a nasal.

(3) The V is always /ɑ:/ - No other example comes to one's mind.

10.4.2 Medial syllable in a polysyllabic word

10.4.2.1 CV

/pɑ-ɳə-kɑ:-ɾəᴺ / (rich man)

/mɑ:-mi-jɑ:-ɾ/ (mother-in-law)

/pɑn-d̪i-jəᴺ/ (bet)

/mɑ-nə-sɨ/ (mind)

/tʃan-də-ŋəᴺ/ (sandalwood paste)

/pal-li-ku:-ɖəᴺ/ (school)

/ka-ʂa:-jəᴺ/ (decoction)

/am-ba-ʈəᴺ/ (barber)

/a-ʐə-hɨ/ (beauty)

/ma-lɨ-vɨ/ (cheap)

/ak-ɾə-məᴺ/ (unjust)

10.4.2.2 Notes:-

(1) The C can be a voiced stop (never a voiceless stop), either of the lateral approximants, any fricative, either of the central approximants, any nasal (one can't think of an example with /ɲ/) or the alveolar tap /ɾ/.

(2) The V can be any vowel.

10.4.2.3 CVC

/ko-ʈa:ŋ-gi-tʃi/ (coconut shell)

/a-və-nam-bi-ke/ (disbelief)

10.4.2.4 Notes:-

(1) The initial C is either a stop or a nasal.

(2) The V can be any vowel.

(3) The final C is a nasal.

10.4.2.5 CC or CCC

/van-dɾ-ka:/ (they've come)

/po:-ʈɳ-ɖɾn-da:/ (they were putting)

Note The syllabic consonant is either /n/ or /ɳ/ or /ɾ/.

10.4.2.6 CCV

/ʋan-d̪ɳ-d̪ɾi-ka:/ (they are coming)

10.4.3 Final syllable of Polysyllabic words

10.4.3.1 V - No examples

10.4.3.2 CV - /pa-ɖi/ (measure)

/pa-ʈi/ (cowshed)

/pa-ɸi/ (hunger)

/pa-ni/ (dew)

/aɲ-dʒɨ/ (five)

/pa-tʃe/ (green)

/a:-ɳe/ (oath)

/ʋa-ɾeᴺ/ (I'm coming)

10.4.3.3 Notes:-

(1) The C can be any consonant.

(2) The V can be anything but /a/, /o/, /ə:/ and /ɨ:/.

(3) The V can be a /Vᴺ/.

10.4.3.4 CC

/ʈe:-bɭ/ (table)

/ke:bɭ / (cable)

10.4.3.5 CVC

/ai-jəɾ/ (a brahmin)

/dʒa-mi:n-d̪a:ɾ/ (landlord)

/kaʈ-ɾi-ko:l/ (scissors)

/maɲ-dʒəɭ/ (yellow)

10.4.3.6 Notes:-

(1) The initial C is a semi-vowel, a stop, an affricate or a nasal. No approximant - central or lateral - occurs in the initial C position.

(2) The V can be any vowel.

(3) The final C is a lateral approximant or the alveolar tap /ɾ/.

10.4.3.7 From the analysis of the initial, medial and final syllables of polysyllabic words, we can come to some general conclusions regarding the structure of a Tamil syllable.

(a) The word-initial V is any vowel.

(b) The word-medial (syllable initial or medial) V is any vowel.

(c) The word-final V is any vowel except /a/, /o/, /ə:/ and /ɨ:/.

(d) The word-initial C can be anything except /ɳ/, /ɭ/ and /ɻ/.

(e) But all these three consonants can be the initial C element of a word-medial syllable of the structure CV or CVC.

(f) Consonant clusters occur in word-initial position and rarely in word-medial position. The first element of a consonant cluster is a stop, /ʋ/ or /n/. The second element is always /ɾ/ or /j/.

(g) Word-medial syllabic consonants are /ɳ/ and /ɾ/ and word-final syllabic consonant is /ɭ/.

Chapter XI

Suprasegmental Features

(pages 503 - 562)

Chapter XI

11 SUPRASEGMENTAL FEATURES.

11.1 General Remarks:-

11.1.1 In this short chapter the suprasegmental features of the dialect of Tamil under survey are briefly analysed. Attention is focussed on two features - stress and intonation. The present writer checked these two features by listening to a number of words and short sentences with the help of a tape repeater. In addition, the intensity meter, the pitch meter and the Kay Sonograph were used during the course of the present research to arrive at certain conclusions regarding word-stress and intonation.

11.2 STRESS:-

11.2.1 Before going into the details of stress in Tamil, a few definitions of the word 'stress' are quoted from well-known writers on Linguistics.

11.2.2 Bloomfield (1933 - 1969 ed., 110-111) says: "stress - that is, intensity or loudness - consists in greater amplitude of sound waves, and is produced by means of more energetic movements, such as pumping more breath, bringing the vocal cords closer together for voicing, and using the muscles more vigorously for oral articulations". The same author says that stress "consists in speaking one of these syllables louder than the other or others". [1]

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1. Bloomfield (1933 - 1969 ed., 90).

11.2.3 Bloch and Trager (1942, 35) equate stress with "degree of loudness". Jones (1964 - 1969 ed., 245) says: "stress may be described as the degree of force with which a sound or syllable is uttered. A strong force of utterance means energetic action of all the articulating organs... it involves a strong 'push' from the chest wall and consequently strong force of exhalation; this generally gives the objective impression of loudness".

11.2.4 According to Gimson (1962 - 1969 ed., 217), "A sound or a syllable which is stressed is one upon which there is expended in the articulation relatively greater breath effort and muscular energy... [in physical terms, stress results in] "relating great intensity of the sound or the syllable, such intensity being perceived by the listener as greater loudness associated with the sound or syllable".

11.2.5 Robins (1964 - 1968 ed., 108-109) points out that "stress is a generic term for the relatively greater force exerted in the articulation of a part of an utterance ... stress is often associated with greater loudness".

11.2.6 Coustenoble and Armstrong (1934, 2) observe "stress means the speech energy which is used in pronouncing a syllable. Speech energy is, of course, used in pronouncing all syllables; but the term stressed is reserved for those which are pronounced with more energy than their neighbours".

11.2.7 According to Pike (1947, 250 and 263), stress is a "degree of intensity upon some syllable which makes it more prominent or louder than an unstressed syllable".

11.2.8 In the following discussion of stress in Tamil, the term "stress" refers to the degree of force with which a syllable is uttered.

11.2.9 In English, for example, in a word of more than one syllable, one of the syllables is uttered with more energy by the speaker - one of the syllables is stressed. The correct placing of the stress in words like 'export, i'deal, exami'nation, oppor'tunity, is very difficult for a native speaker of Tamil, for the stress system of Tamil is totally different.

11.2.10 In Tamil the stress is placed evenly on all the syllables of a polysyllabic word. A word like [pʻaːʈʻɪ] (grandmother) is not pronounced ['pʻaːʈːɪ] nor is it pronounced [pʻaː'ʈʻɪ]. It is just pronounced [pʻaːʈʻɪ] with equal stress on both syllables in the ordinary, unemotional stream of speech. If the word is pronounced with greater stress on one or the other of the syllables it sounds odd to a Tamilian's ears.

11.2.11 In English stress is distinctive - it serves to differentiate between words. 'Export and Ex'port, 'import and im'port, 'contest and con'test are some oft-quoted examples. In Tamil no pairs of words are ever distinguished solely by stress. Voice is distinctive in Tamil. Vowel length is distinctive, consonant length is distinctive, but never stress.

11.2.12 A few words (about 200 words) were tape-recorded and listened to carefully several times with the help of a tape repeater. The words were disyllabic, trisyllabic, quadrisyllabic and pentasyllabic. All the words were normally pronounced during the recording - it is possible to change the implication of a word by changing the intonation and this was not done during the recording. By listening to these words, the present writer was able to come to the conclusion that there was no appreciable difference between the force with which the different syllables of a word were uttered. In other words, he could not detect any stressed syllables in the test words he used.

11.2.13 Mingograms were made of some of these test words. The mingograph was connected to an electric aerometer, a Frøkjaer-Jensen Trans pitch meter and a Frøkjaer-Jensen intensity meter and eight channels of the mingograph were used. The expiratory air-flow through the mouth during speech, the expiratory air-flow through the nose during speech and the vibrations (or the lack of any) of the vocal cords are registered on the three bottom lines of these mingograms. This was done in order to be able to segment these utterances and check the intensity/pitch of a particular voiced segment.

11.2.14 These mingograms were studied carefully and the intensity of the syllabic nuclei calculated. It is

worthwhile quoting Fry (1968, 384-385) in this connection. "The measuring of speech intensity presents ... problems ... the difficulty is to know exactly what ought to be measured. Since we are interested in intensity as the correlate of loudness, we may begin by saying that we need to know the total amount of acoustic energy arriving at the listener's ear at a given moment, but the question immediately arises as to which moment, or more precisely, how long is the 'moment' to be ... A partial answer to such questions is given by saying that generally the intensity measurements we are most interested in are relative measurements. These would show how sounds differ in intensity in one continuous utterance or how the 'same' sound differs in different utterances..."

11.2.15 Two main difficulties were encountered when an attempt was made to measure the intensity of syllabic nuclei in various words. The intensity curve as recorded by the mingograph is not a clean line - it is a spiky line with several ups and downs. The calibration given for intensity (the calibration sheet is reproduced after the mingograms are reproduced a little later in this chapter) is presumably made with a fairly high frequency input and that is why it shows as a clean line. The question arises as to how one should use a calibration sheet which shows intensity in clean straight lines to measure

intensity which is recorded as anything but a straight line. What we have done is to sketch a line through the middle of the oscillation on the trace. There is one qualification to be made - we have ignored the usual non-symmetrical nature of the speech acoustic wave.

11.2.16 The second difficulty was the one described by Fry quoted above. The first vowel in the word [pʻɑ:tʻɪ] (grandmother), for example, has a duration of 210 m.secs. and the same vowel has an intensity range of 6 db over this duration (46 db at the beginning, 44 db in the middle and 40 db towards the end). We have decided to take it as 44 db. It is a fairly arbitrary decision, but there seems to be one justification. Looking at the other intensity tracing (the one showing the intensity that has been passed through a HP filter - with the lower ranges of intensity not recorded at all) it does seem to have a peak at this level. So in all measurements of intensity, the middle of the vowel has been chosen and the intensity at this moment has been calculated.

The calculations are tabulated below:-

11.2.17 Table 22:-

Disyllabic words (both short vowels)

Word used	Intensity of vowel - I syllable (decibels)	Intensity of vowel - II syllable (decibels)
[pʻɑt̪:ɪ] (cowshed)	40	43
[kʻɑt̪:ɨ] (tie - imp.)	42	40
[pʻɑt̪:ɨ] (silk)	43	40
[t̪ʻɑp:ɨ] (fault)	43	40
[ɑt̪:ɛ] (aunt)	43	42
[kʻot̪:ɔ] (dig - imp.)	46	45
[kʻɔt̪:ɔ] (punch - imp.)	46	45
[pʻɪ t̪:ɨ] (madness)	44	43
[pʻɛɾɨ] (beget - imp.)	43	44
[pʻot̪:ɔ] (cover - imp.)	47	47
[t̪ʻɨt̪:ɨ] (scold - imp.)	43	43
[kʻɵt̪:ɨ] (having lost)	47	45
[kʻɑɽɪ] (bite - imp.)	45	43
[pʻɑɽɪ] (measure)	44	42
[ɔp:ɔ] (salt)	46	45
[jɛlɪ] (rat)	45	43
[ɪp:ɵ] (now)	43	44
[ɑm:ɑ:] (mother)	45	44
[ɑp:ɑ:] (father)	46	46

11.2.18 Table 23:-

Disyllabic words (one long vowel & one short vowel)

Word used	Intensity of vowel - I syllable (decibels)	Intensity of vowel II syllable (decibels)
[pʻɑ:ʈ•ɪ] (grandmother)	44	42
[kʻɑ:ʈ•ɨ] (show - imp.)	44	40
[kʻu:ʈ•ɑ] (a wild type of dancing)	47	45
[pʻi:ʈ•əl] (rags)	45	43
[pʻe:ɾɨ] (name)	44	43
[pʻo:ʈ•ɑ] (cover with a blanket - imp.)	43	44
[ʈʻɨ:ʈ•ɨ] (sharpen - imp.)	46	44
[kʻə:ʈ•ɨ] (having asked)	47	45
[ɑ:mɛ] (tortoise)	47	44
[u:ʈ•ɑ] (pour - imp.)	46	44
[u:ɸɪ] (needle)	47	44
[ɑ:ɽɨ] (goat)	48	46
[ɑ:ɾɨ] (six)	48	46
[i:ɸəl] (ants)	44	43
[ə:ɳɪ] (ladder)	45	43
[ɨ:ɽɨ] (an equivalent)	46	44
[ɨ:ʈ•ɪ] (spear)	46	43
[ə:ʐɨ] (seven)	45	44
[kʻɑ:ɽɨ] (forest)	48	45
[pʻo:ɽɑ] (put - imp.)	47	45

11.2.19 Table 24:-

Trisyllabic words.

Word used	Intensity of vowel - I syllable (decibels)	Intensity of vowel - II syllable (decibels)	Intensity of vowel - III syllable (decibels)
[kʻaɾɨkʻəl](clouds)	48	48	46
[mɔkʻaːlɪ] (a three-legged stool)	43	46	43
[pʻoɾɔt̪ʻʌ̃](suitability)	43	45	45
[pʻaʈʻaːlʌ̃] (army)	42	47	47
[əʈʻəɳaː] (eight annas)	40	42	42
[t̪ʻakʻaːlɪ] (tomatoes)	44	47	43
[kʻaɾɨpʻɨ] (black)	44	43	43
[pʻaɾɨpʻɨ] (lentils)	45	43	43
[pʻaʈɪpʻɨ] (studies)	45	42	43
[manːɪpʻɨ] (forgiveness)	44	42	44
[ɸoːmbeːɾɪ] (lazy person)	43	43	42
[kʻaʐɨt̪ʻɨ] (neck)	45	44	43
[kʻaʈʻaːʐɛ] (cactus)	45	48	42

11.2.20 Table 25:-

Quadrisyllabic words

Word used	Intensity of vowel - I syllable (decibels)	Intensity of vowel - II syllable (decibels)	Intensity of vowel - III syllable (decibels)	Intensity of vowel - IV syllable (decibels)
[pʻaɳəkʻaːɾÃ] (rich man)	41	42	46	45
[pʻaɭːɪkʻuːɽÃ] (school)	44	42	46	45
[t̪ʻaɳɖəʋaːlÃ] (rails)	42	43	46	46
[ʋaɳɖɪkʻaːɾÃ] (cartman)	40	45	47	40
[tʃɪ ɖ̪ambaɾÃ] (name of a town)	43	45	44	45
[pʻɪ t̪ʻɨkʻɔlɪ] (mad man)	42	44	43	41
[t̪ʻɛɾɨkʻuːt̪ʻɔ] (a kind of village entertainment)	43	44	46	42

11.2.21 Table 26:-

Pentasyllabic words.

Word used	Intensity of vowel - I syllable (decibels)	Intensity of vowel - II syllable (decibels)	Intensity of vowel - III syllable (decibels)	Intensity of vowel - IV syllable (decibels)	Intensity of vowel - V syllable (decibels)
[mənək'ɑŋək'ɨ] (mental arithmetic)	38	43	44	44	46
[k'ɑŋək'ɨp'ɨ]ː[ɛ] (accountant)	42	43	44	44	45
[p'ɑiʈ'ɪjək'ɑːɾɑ̃] (mad man)	46	43	43	48	46
[əʐɨʋɑʈ'ɑːɾɨ] (seventy six)	44	44	46	47	44

11.2.22 In Table 22 which tabulates the intensity of the two vowels in disyllabic words we see that both the vowels are short. In most of the examples, we see no difference at all in the intensity of the two vowels. In some there is a difference of one decibel and in some two decibels. In three examples there is a difference of three decibels.

11.2.23 In Table 23 we have disyllabic words, but the vowels in the first syllables are long and those in the second syllables are short. Except in one example, the vowels in the first syllables are of a higher intensity than the ones in the second syllables. Here again, the maximum difference in intensity between the two vowels in a word is two decibels. This difference we come across in the word [kʻɑ:ʈʻɨ] (show - imp.). This is understandable because [ɑ:] which has an intensity of 44 decibels (in this case) is an open vowel and [ɨ] which has an intensity of 40 decibels (in this case) is a vowel which is nearly close. The higher intensity of the vowels in the first syllables is attributed to the vowel length.

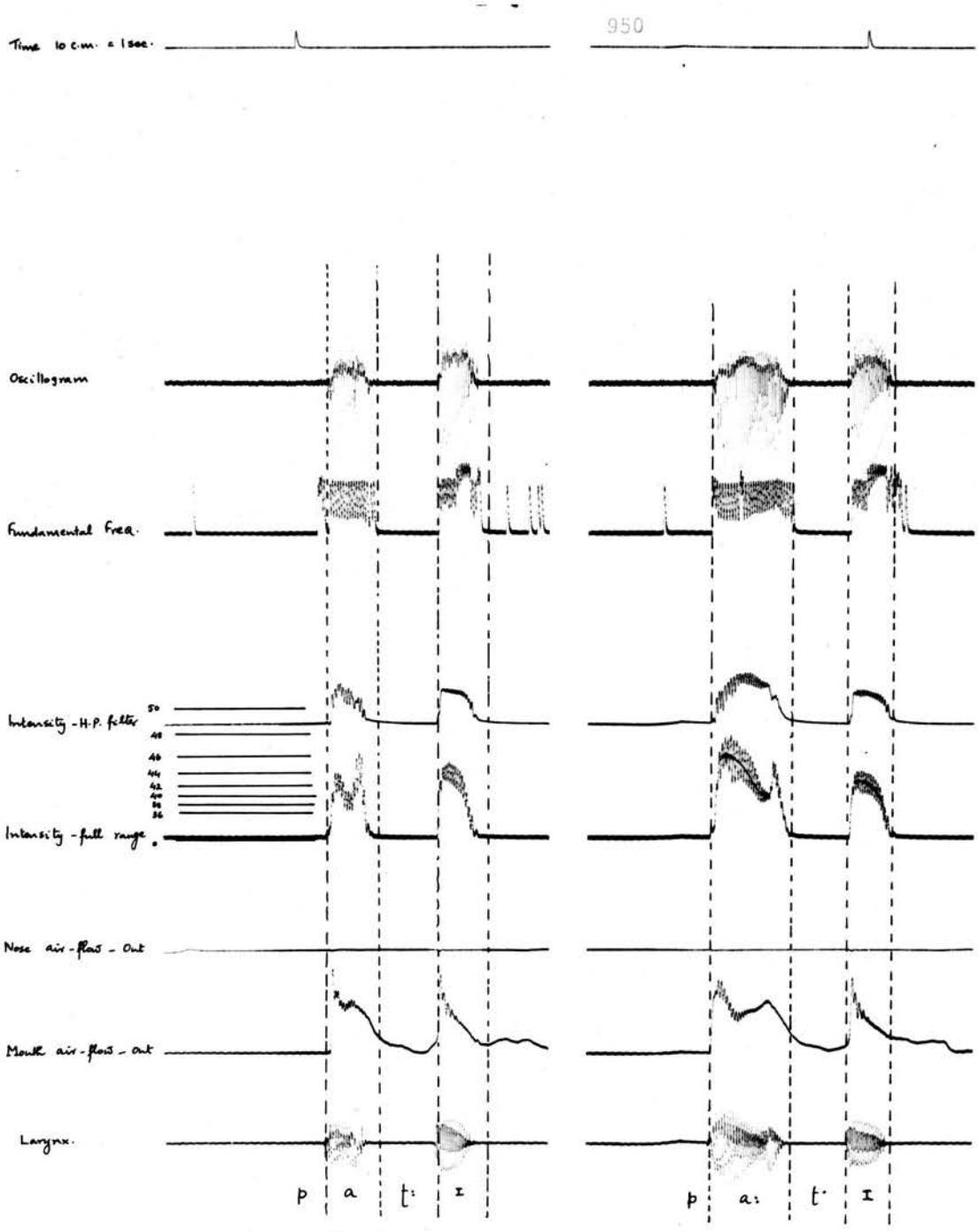
11.2.24 Table 24 shows the intensity of the three vowels in each trisyllabic word. Except in one word [pʻɑʈʻɑ:ɭÃ] (army) where there is a difference of five decibels between the vowel of the first syllable and those of the second and third syllables,

we see a difference of two to three decibels between the intensity of the vowels. Again we see here that the intensity of the open vowels is slightly higher than that of the close vowels. Long vowels too show a higher intensity than short vowels.

11.2.25 Tables 25 and 26 show the intensity of various vowels in polysyllabic words. Here again we see [a:] (open long vowel) showing the highest intensity, the other long vowels showing higher intensities and short and close vowels showing least intensities.

11.2.26 A few of these mingograms are reproduced in the next few pages. The intensity meter used (the Frøkjaer Jensen one) can record intensity from 20 decibels to 50 decibels, calibrated in 2 decibels. The calibration sheet used has also been reproduced, immediately after the mingograms. The relevant intensity ranges have been marked on the left hand corder of each of the mingogram reproduced in this chapter.

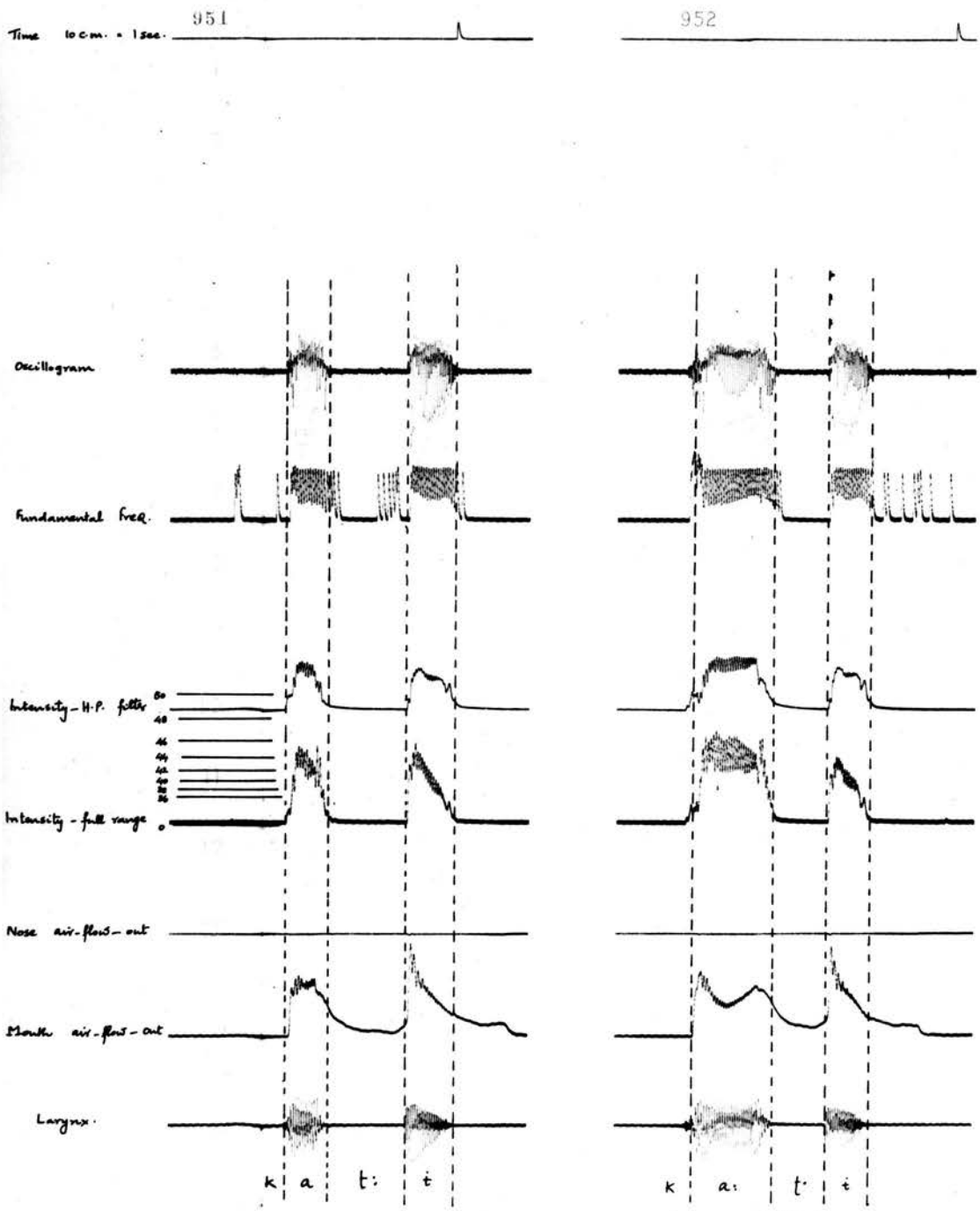
WORD-STRESS AND INTENSITY



Mgm. 1
[p'aʧ:ɪ] (cowshed)

Mgm. 2
[p'a:t·ɪ] (grandmother)

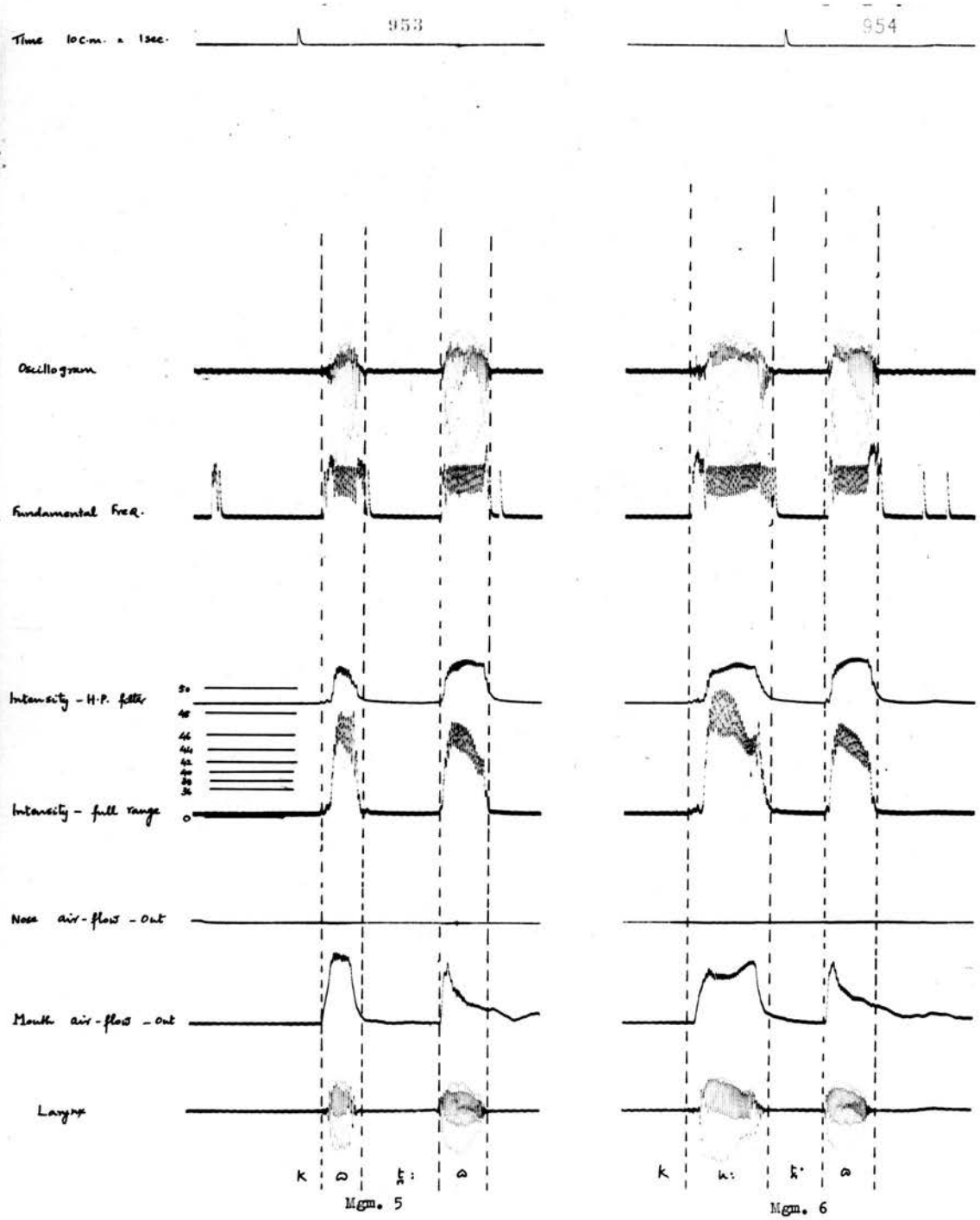
WORD-STRESS AND INTENSITY



Mgm. 3
[k'aʧ:ŧ] (tie-imp.)

Mgm. 4
[k a :ʧ'ŧ] (show-imp.)

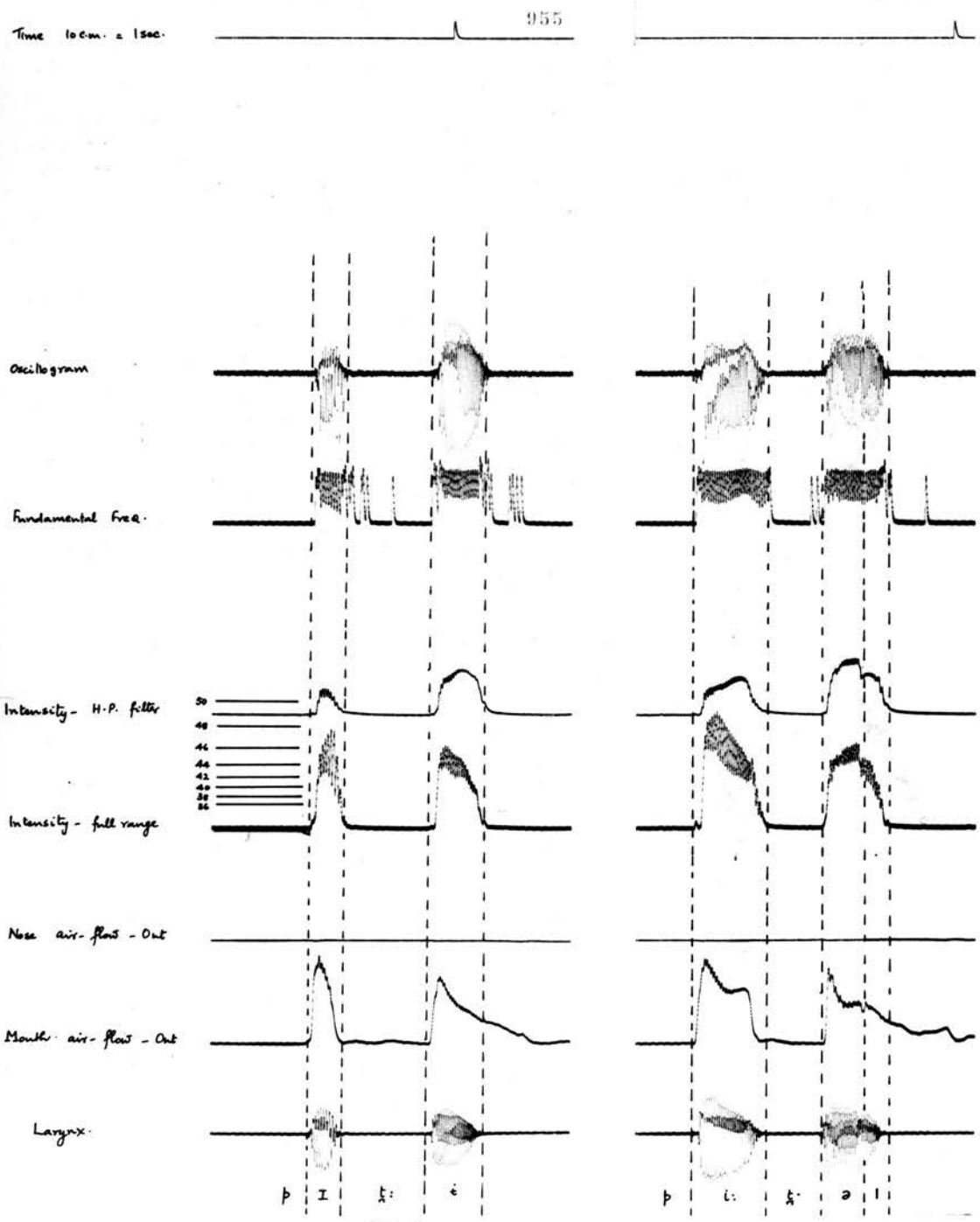
WORD-STRESS AND INTENSITY



Mgm. 5
[k'ɑ t:ɑ] (punch-imp.)

Mgm. 6
[k'u:t•ɑ] (a wild type of dance)

WORD-STRESS AND INTENSITY



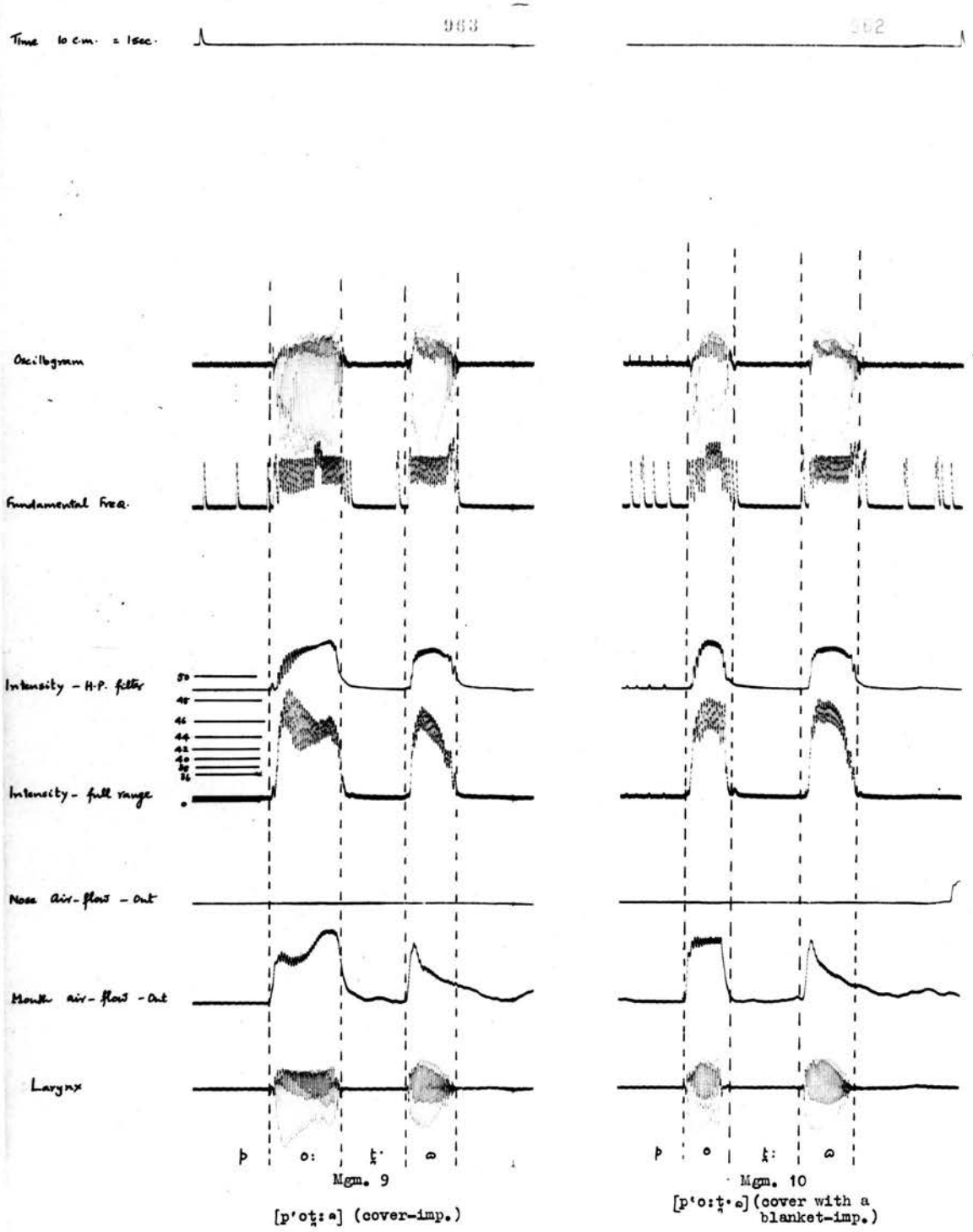
Mgm. 7

[þ'ɪ ţ:ɨ] (madness)

Mgm. 8

[þ'i:ţ·əl] (rags)

WORD-STRESS AND INTENSITY



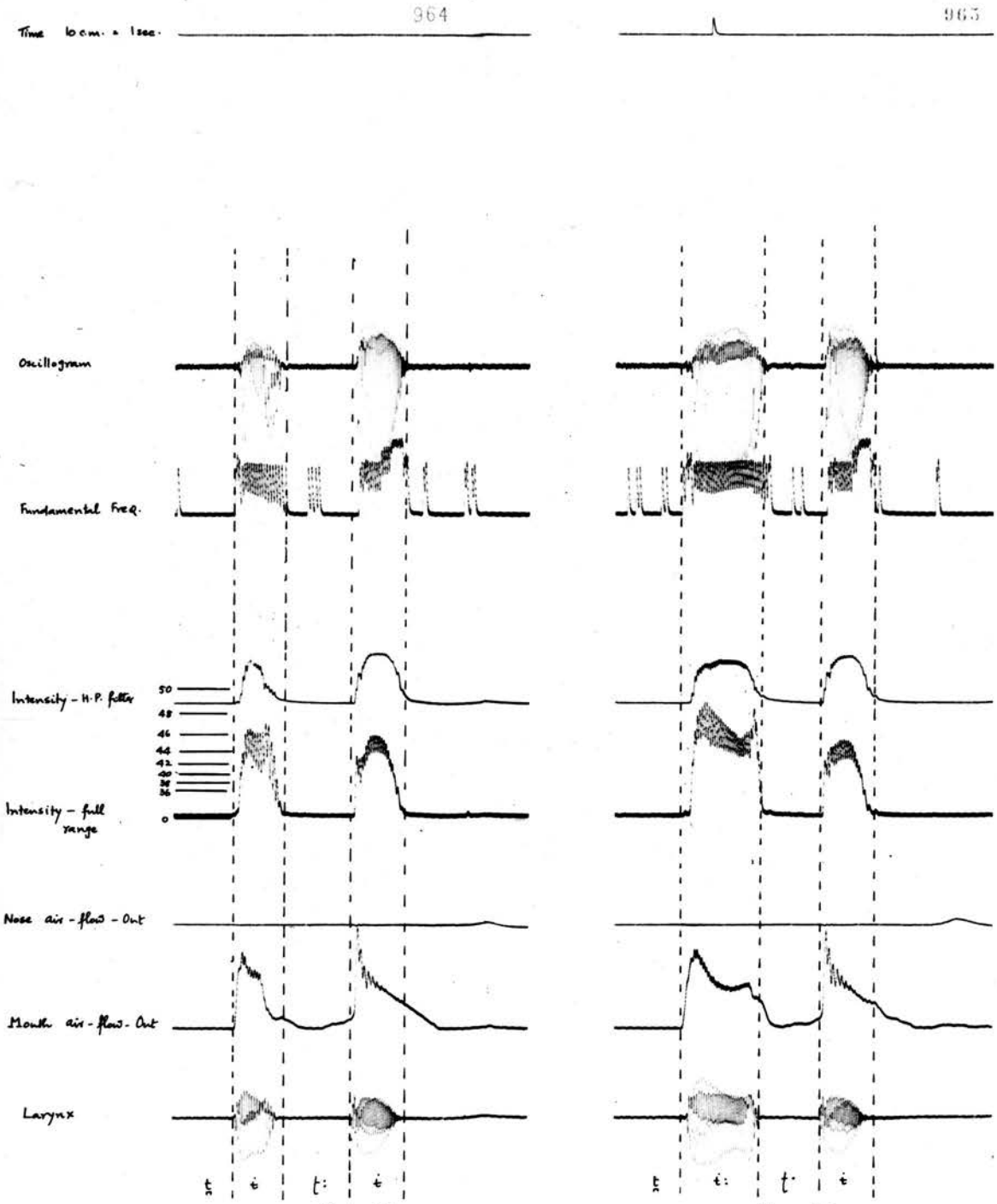
Mgm. 9

[p'ot:ɑ] (cover-imp.)

Mgm. 10

[p'o:t·ɑ] (cover with a blanket-imp.)

WORD-STRESS AND INTENSITY



Mgm. 11
[t̪ʻɛtːɛ] (scold-imp.)

Mgm. 12
[t̪ʻɛːtˑɛ] (sharpen-imp.)

11.2.27 Now an interesting question arises. What is the minimum difference of intensity one can fix between the two vowels of a disyllabic word, the three vowels of a trisyllabic word etc., exceeding which one can say that one of the syllables is stressed? If the Tables above show absolutely no difference at all between the intensities of the vowels in various syllables, one can conveniently and confidently declare that all syllables in a word are equally stressed. But as we can see from the Tables, this is not the case. Can we then fix the difference in intensity between the two vowels in a word to be one decibel and say that if the difference exceeds one, then one of the syllables is stressed ? Before answering these questions, we have to consider the circumstances under which a syllable is stressed in Tamil.

11.2.28 Stress is used both in individual words and in connected speech in Tamil. In individual words, stress is used for emphasis. There are minimal pairs contrasting /l/, /ɭ/, /ʐ/ and /ɖ/. Should a pupil or a listener misunderstand the hearer, the speaker emphasizes the syllable in which the sound he originally used occurs. There are four words contrasting the above-mentioned four phonemes.

/t̪ale/	[t̪ʻalɛ]	(head)
/t̪aɭe/	[t̪ʻaɭɛ]	(bondage)
/t̪aʐe/	[t̪ʻaʐɛ]	(leaf)
/t̪aɖe/	[t̪ʻaɽɛ]	(a barrier, an obstacle)

If the speaker says [t̪ʻɑlɛ] and the hearer misunderstands this word to mean something else, then the speaker will stress the second syllable of this word and pronounce it [tʻɑˈlɛ].

11.2.29 Such emphatic stress is not confined to any particular syllable. If [ɑɽɛ] (a type of cake) and [əɽɛ] (weight), [pʻɑt̪:i] (ten) and [pʻɑ:t̪ʻi] (having seen) are misunderstood or confused one for the other, then the first syllable of the word meant by the speaker is stressed. If a pupil uses the ordinary III person singular ending instead of the honorific ending in a polysyllabic word, then the last syllable is stressed by the teacher thus:

not [pʻɑɳəkʻɑ:ˈɾɑ̃] but [pʻɑɳəkʻɑ:ˈɾəɾ]
(rich man) (rich man - honorific)

not [ʋɑn̪d̪əˈʋɑ̃] but [ʋɑn̪d̪əˈʋəɾ]
(the one who came) (the one who came-honorific)

11.2.30 A listener, if he is not clear about what he has heard a speaker say, may repeat the word that he thinks he has heard and another one very near it in pronunciation. While doing so, he stresses that syllable in each of the words that are responsible for the confusion. A few examples are cited below, with the stress mark [ˈ] placed before the syllables that are stressed.

['pʻoʈːɪjaː 'pʻoːʈʻɪjaː]

(Did you say 'box' or 'competition' ?)

['t̪ʻɔlɪjaː 't̪ʻuːlɪjaː]

(Did you say 'a drop' or 'a cloth cradle'?)

11.2.31 A few mingograms were taken of such expressions and the intensity of the vowels calculated. These sentences are given below, with the intensity of the vowel (in decibels) marked under each vowel symbol.

(1) [pʻaʈʻɪ jaː p'aːʈʻɪ jaː]
44 42 42 48 42 38

(Did you say 'cowshed' or 'grandmother'?)

(2) [mɔʈʻɛjaː muːʈʻɛjaː]
46 46 38 49 44 36

(Did you say 'an egg' or 'a bundle'?)

(3) [maːŋgaːjaː t̪ʻeːŋgaːjaː]
44 42 40 46 44 38

(Is it 'mango' or 'coconut' that you said?)

(4) [pʻoʈʻɔnːəjaː pʻoːt̪ʻɔnːəjaː]
48 42 42 42 47 42 40 36

(Did you say 'cover' or 'cover with a blanket'?)

(5) [kʻəʈʻəvənaː kʻəːʈʻəvənaː]
47 43 42 44 48 44 42 38

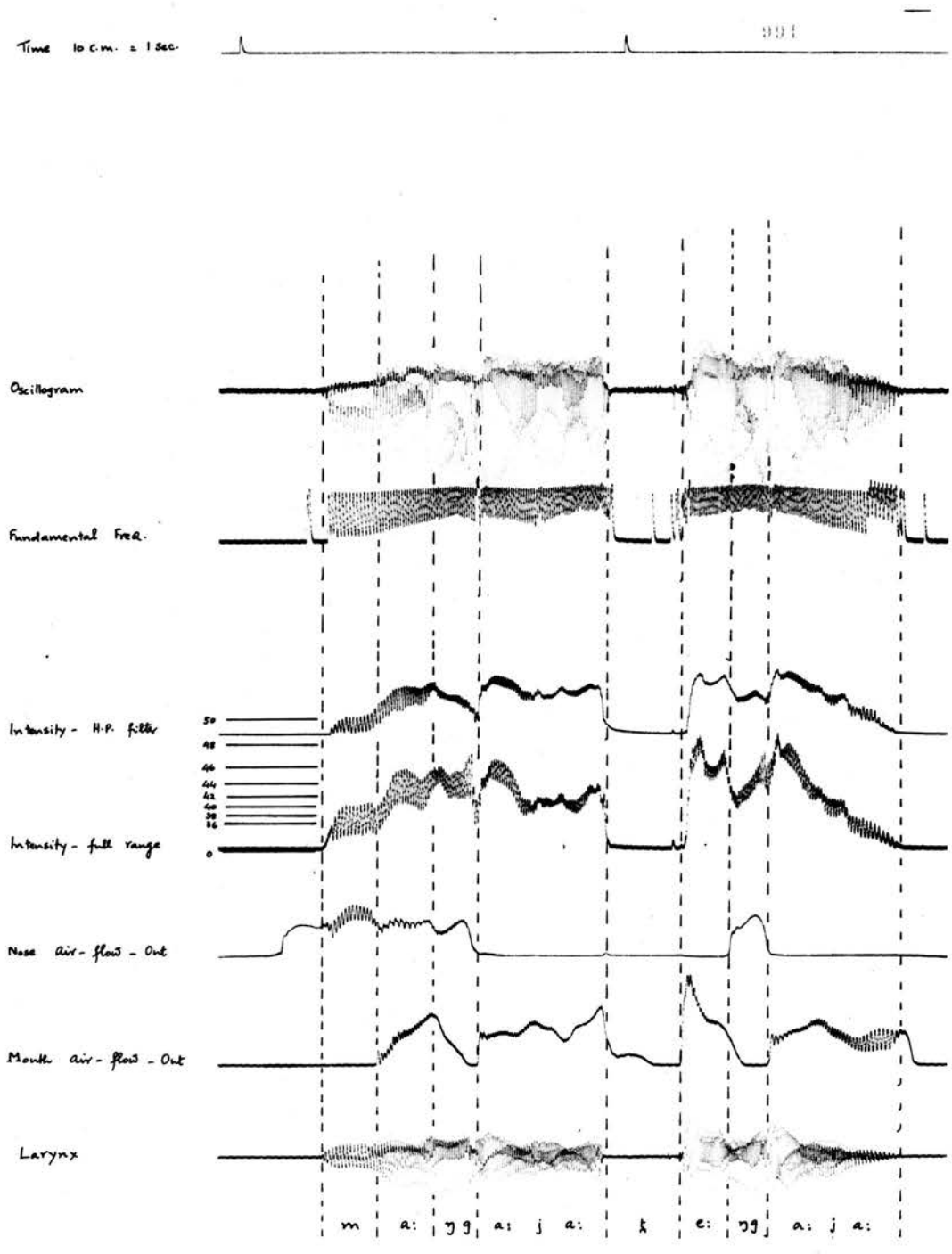
(Did you say 'the one who is bad' or 'the one who asked'?)

(6) ['kɔɾɛ kʻoːɾɛ ɪlːɛ]
46 38 48 36 40 40

(I said 'umbrella' not 'summer')

A few of these mingograms are reproduced in the next few pages.

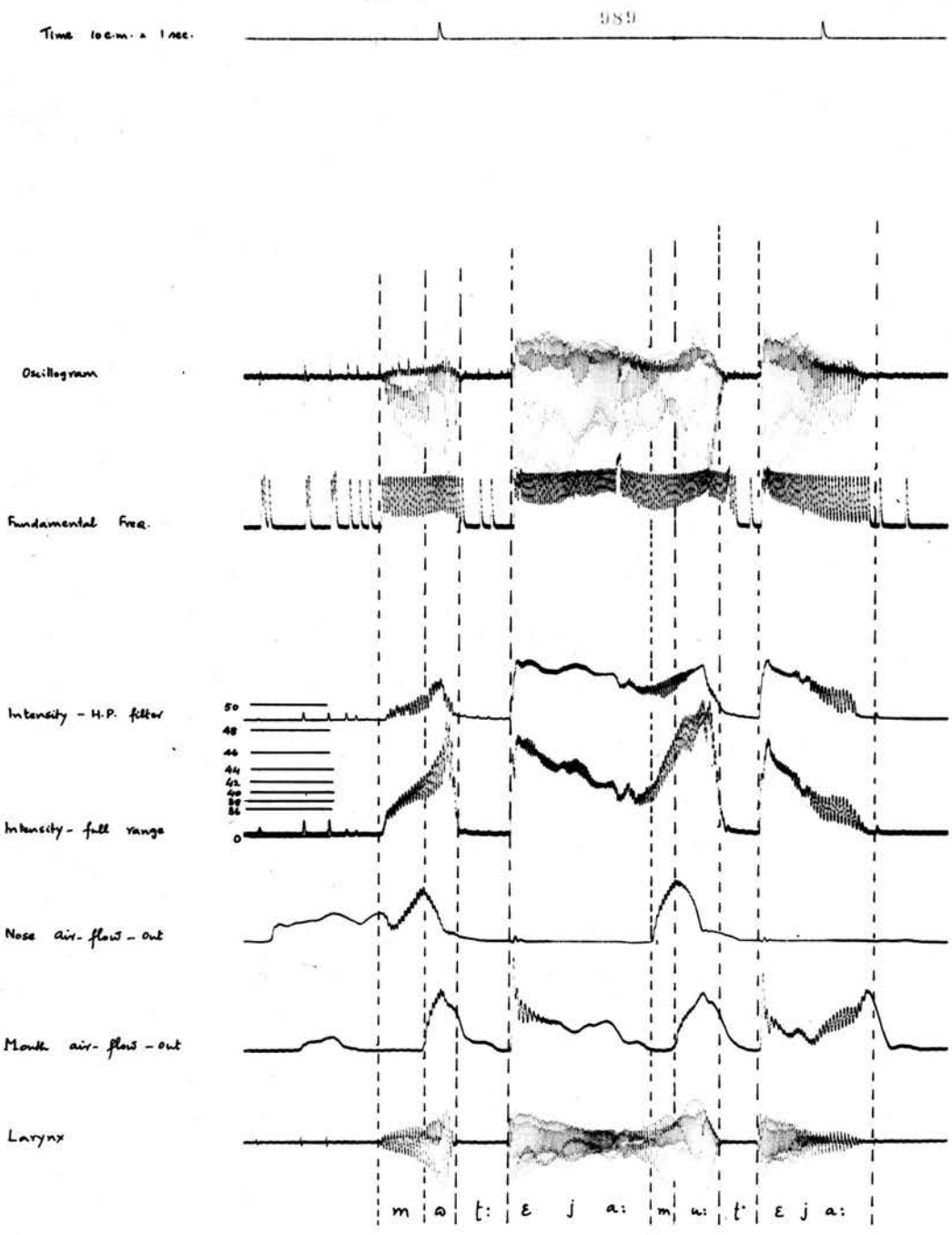
WORD-STRESS AND INTENSITY



Mgm. 13

[ma:ŋga:ja: t̪'e:ŋga:ja:] (did you say 'mango' or 'coconut'?)

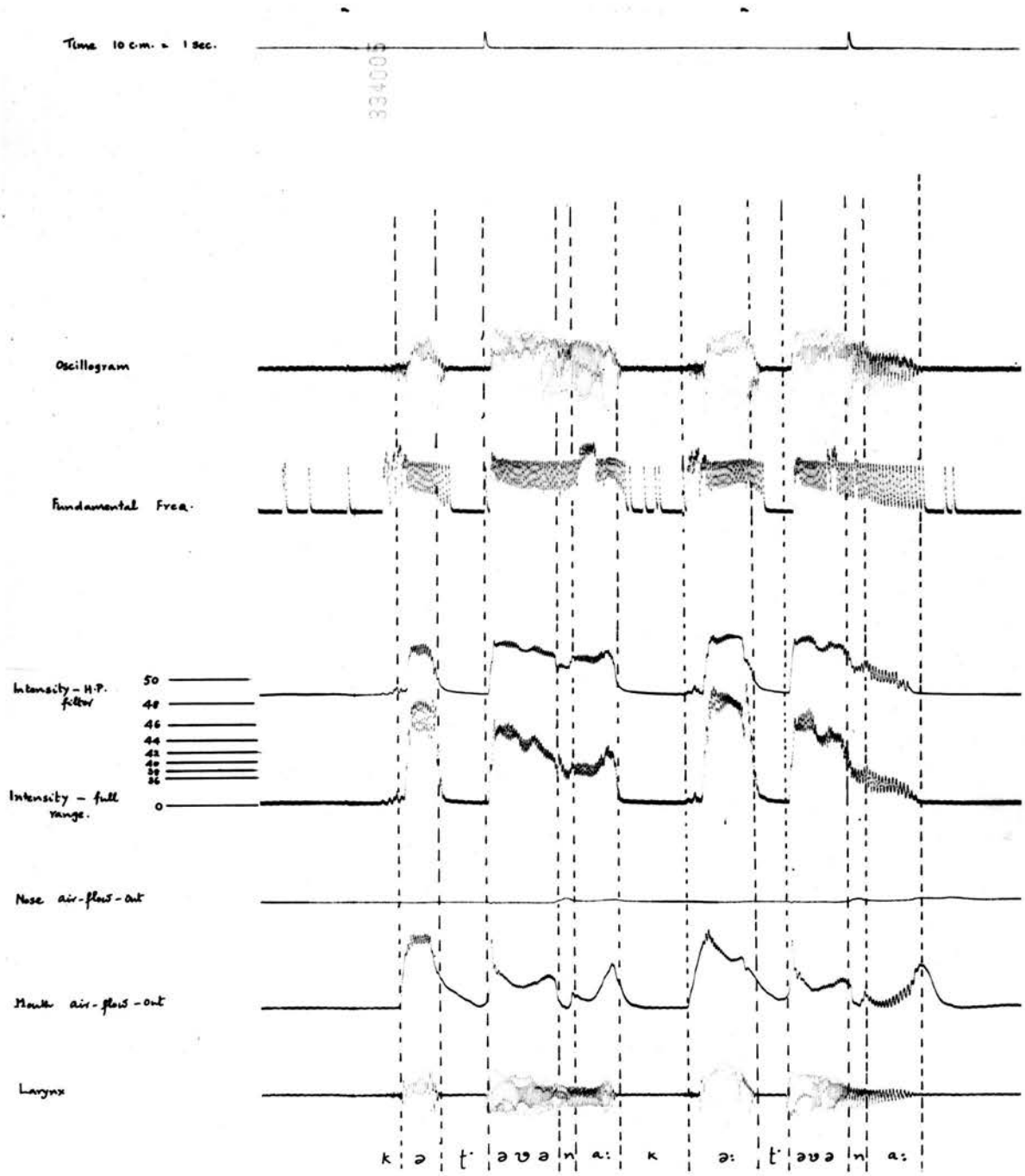
WORD-STRESS AND INTENSITY



Mgm. 14

[m ɑt: ɛ j a: mu: t'ɛj a:] (Did you say 'egg' or 'bundle'?)

WORD-STRESS AND INTENSITY



Ilgm. 15

[k ə ʧ·əʊnaː k ə ːt·əʊnaː] (Did you say 'bad man' or 'the one who asked'?)

Calibration Sheet

Oscillogram

Fundamental Freq.

Intensity H.P. filter

50 db

Intensity (full range)

0

Nose air-flow - out

Mouth air-flow - out

Larynx

11.2.32 In these expressions, the stressed vowel has a considerably higher intensity. The difference between the intensity of the vowel in the syllable that is deliberately stressed by the speaker and that of the vowels in the other syllables is appreciable. There is a difference of six, eight, or even ten decibels in some cases. Comparing these differences with the differences (if any) that we saw in Tables 22-26, one can say that in normal utterances, no syllable of a Tamil word is particularly stressed.

11.3 Sentence stress:-

11.3.1 In normal unemotional speech, a short sentence in Tamil is like a big polysyllabic word. No syllable in any single word receives any special stress. Thus a sentence like "He is a boy" is uttered without any undue stress on any syllable thus:

[ʌʋ̃ʌ̃ woro p'ɑijʌ̃]

(he a boy)

and similarly the sentence "the grandmother who lives next door came" is pronounced

[p'ɑk'ɐt̪'i ʋi:ʈ'ɨp'ɑ:ʈ'ɪ ʋɑn̪n̪ɑ:]

(next house grandmother came)

11.3.2 But it is possible that the context requires a particular word in a sentence emphasised. Thus

a sentence like "she is my younger sister" may be pronounced

[avə jɛn t̪'aŋgɛ]
(she my younger sister)

which would imply an ordinary, matter-of-fact statement, or

[avə jɛn t̪'aŋgɛ] (i.e., the one I am pointing, not the other one standing next to her).

or [avə jɛn t̪'aŋgɛ] (not the other man's who is here)

or [avə jɛn t̪'aŋgɛ] (not my cousin)[2]

11.4 INTONATION:-

11.4.1 The following is a preliminary attempt at a scientific and methodical study of intonation in Tamil. To the present writer's knowledge there is no account of Tamil intonation [3] by any linguist.[4] The present study is thus a first attempt at making

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2. There is no need to stress younger as "she is my younger sister" (and not elder sister) in Tamil, for there are two different lexical items, one [ak:a:] (elder sister) and [t̪'aŋgɛ] (younger sister).
3. Meenakshisundaran (1965,209) and Shanmugam (1970,12-13) have a few words to say about intonation in Tamil.
4. Cf. Zvelebil (1970, 41): "Intonation plays an important role in Dravidian. Though the features of pitch and accent have not yet at all been studied in any Dravidian language, one thing is certain: while there is probably not a (dynamic) stress contrast in any Dravidian language present, we cannot speak at all about intonationless speech when discussing Dravidian; in forming questions or expressing different emotions, the movable pitch of the voice plays an important part, at least on the 'metalinguistic' plane. The problem still remains to be worked out in detail".

some valid statements on this important prosodic feature of Tamil.[5]

11.4.2 Intonation in Tamil plays a grammatical and not a lexical function. In other words, Tamil is an intonation language and not a tone language - as Chinese, Vietnamese or Punjabi. A tone language is one in which intonation carries lexical meaning. To cite an example, in Punjabi (a language spoken in the Punjab in India) a word said in one tone has one meaning and the same word, said in a different tone, has another meaning. [mæ̃] in this language means "I" if said on a level tone and "buffalo" if said in a falling tone.[6] In Tamil, on the other hand, intonation has no such lexical function. But it is possible to make grammatical contrasts in Tamil by changing the intonation. For example, [ɑp:ɑ: ɪl:ɛ] said with a falling intonation, means "father is not here". If the same two words are said with a rising intonation, they mean "Isn't father here?" Taking single words into consideration, [ɪl:ɛ] said with a falling intonation means "no" and the same word, said with a rising intonation, means "no?" or "isn't it?" Again [kʻɑ:t̪ʻɨ], if said on a level pitch thus ¯¯ or on a falling pitch thus ¯\ means "wind" and the same word, if said on a rising pitch thus ¯/

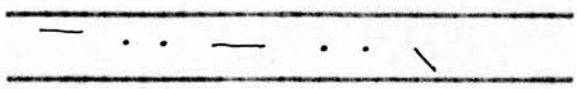
5. Zvelebil (1971, 41) mentions a short paper by S.G.Rudin, "Zamechanija o tamil'skom Slovesnom Udarenii" [Remarks on Tamil word-stress] but the present writer could not get this paper.
6. This information is from Sethi (1971, i).

means "the wind?" - as if the hearer repeats this word out of the many words that he has heard and he wants to know what exactly the speaker said about the wind.

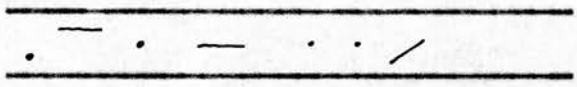
11.4.3 To study the intonation of Tamil, several sentences of various types - assertive sentences, interrogative sentences of the wh- type and "yes/no" type, imperative sentences expressing commands, suggestions etc., and exclamatory sentences - were taped. The sentences were not taped in any order - the list did not contain assertive sentences, interrogative sentences, imperative sentences and exclamatory sentences in this order. The sentences were thoroughly mixed in order to avoid the possibility of the ear getting used to one particular type of intonation by listening to the same type of sentence over and over again. The sentences were listened to with the help of a tape repeater and the intonation pattern was noted down using the line pitch notation.

11.4.4 A word perhaps ought to be said about the line pitch notation employed in this chapter. In English we have seen the dot and line pitch notation employed to indicate the intonation pattern. For example, the intonation of English sentences like "when can I see you?" and "It won't take much of my time" can be represented thus: [7]

7. Both these English examples are from Coustenoble and Armstrong (1934, 60-61).

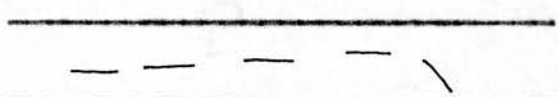


'When can I 'see you a'gain ?



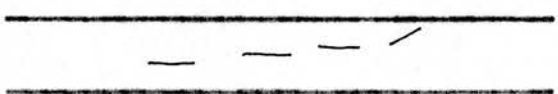
It 'wont take 'much of my 'time.

In this type of visual representation of the pitch pattern, stressed syllables are marked with a dash and unstressed syllables with a dot. But, as pointed out earlier, in Tamil, in non-emphatic unemotional speech, no distinction is made between syllables as far as the energy expended in uttering them is concerned. A short Tamil sentence like [ɑʋəɾ jɛ̃ mɑ:mɑ:] (he is my maternal uncle) sounded to the present writer's ears (when he listened to such sentences with the help of the tape repeater) like:



[ɑʋəɾ jɛ̃ mɑ:mɑ:]

with a gradual increase in pitch till the penultimate syllable is reached and there is a fall in the final syllable. A question like "what is your name?", if asked in a rising intonation (this is discussed later), sounded like

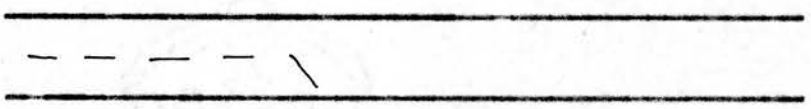


[wom pe:ɾɛn:ə]

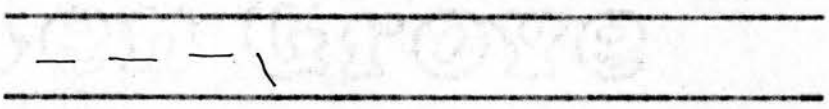
with a gradual increase in pitch with every syllable and then a sharp rise in the last syllable. Hence the pitch pattern of sentences was taken down using the line notation.

11.4.5 The pitch pattern of some of the sentences, as taken down while listening to them, are reproduced below.

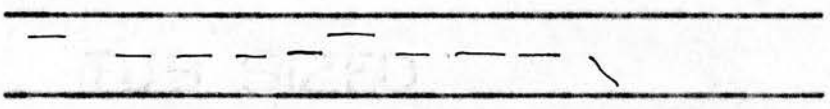
11.4.6 I Assertive sentences.

(1) 

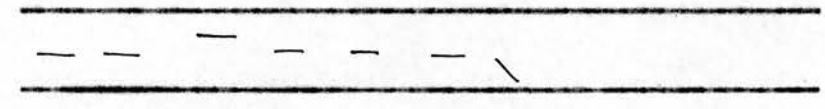
[ɑʊÃ jɛn t̪ʻambɪ] (he is my younger brother)

(2) 

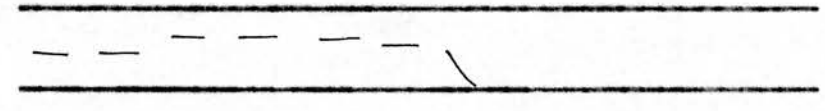
[ɑp:ɑ: ɪl:ɛ] (Father is not here)

(3) 

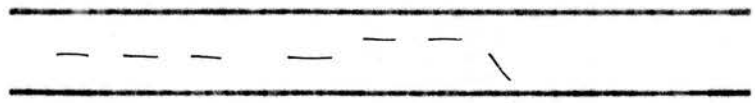
[pʻɑ:t̪•ɨp•o:n:ɨ pʻɑt̪:ɨt̪•ɑrəndʒon:ɛ̃]
(I told him ten times to be careful while going)

(4) 

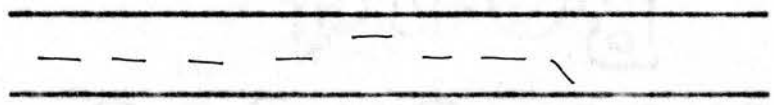
[ɪŋgɛ kʻɑ:t̪:e: ʋɑrɑ:ðɨ]
(you get absolutely no breeze here)

(5) 

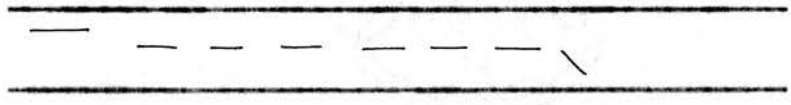
[nɑ:m pʻɑl:ɪkʻu:ɽambo:ɾɛ̃]
(I'm going to school)

(6) 

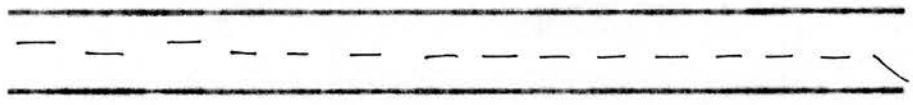
[t̪ʻo:pʻɔlɛ wotʀɔmɪl:ɛ]
(There is no body in the grove)

(7) 

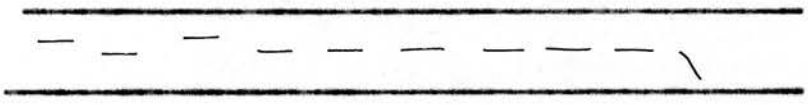
[pʻa:ʈʻɪjɛ pʻaʈ:i:lɛβa:t̪:ɛ̃]
(I saw grandmother in the cowshed)

(8) 

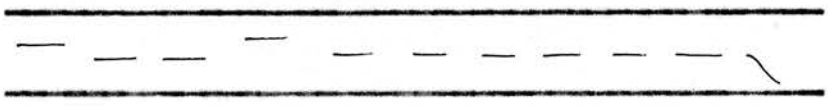
[pʻa:ʈʻɪjɛ paʈ:i:lɛβa:t̪ ɛ̃]
(I saw grandmother in the cowshed)

(9) 

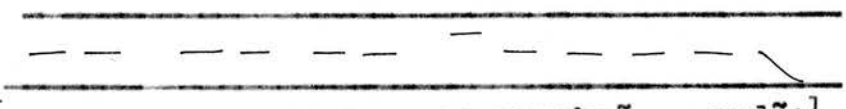
[kʻa:tʻw̃ su:ʀɪjənw̃ woʀɔna:l ɸaɳdɛβo:ʈɳdɨðɨ]
(The wind and the sun were one day disputing)

(10) 

[ka:t̪ʻɨ na:n̪da:mbɛʀɪjəʋən:ɨðɨ]
(The wind said 'I am the stronger')

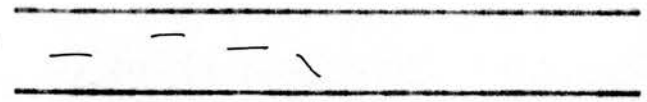
(11) 

[su:ʀɪjÃ na:n̪da:mbɛʀɪjəʋən:ɨðɨ]
(The sun said 'I am the stronger')

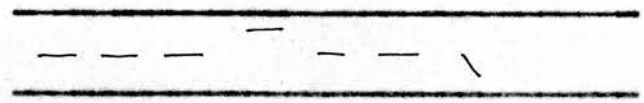
(12) 

[ap:ə aŋgɛ woʀɔ ʋaʐɪpʻo:kʻÃ ʋan̪dã:]
(Then a passer-by came there)

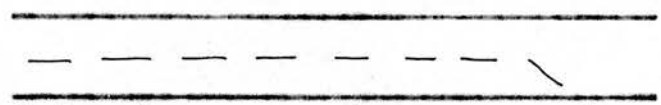
11.4.7 II Wh- Questions:-

(13) 

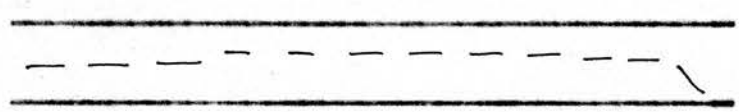
[wom pe:ɾɛn:ə] (what is your name?)

(14) 

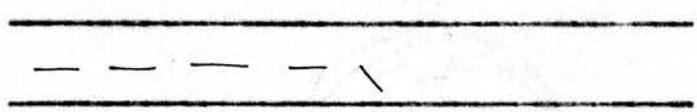
[na:lɛkˑɪ əŋgɛβo:ɾɛ]
(where are you going tomorrow?)

(15) 

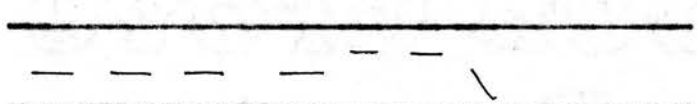
[pʻat̪:ɯ̃ mɔpˑəðɯ̃ jɛʋləʋi]
(How much is ten and thirty?)

(16) 

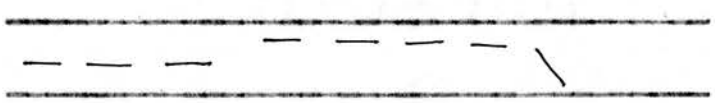
[woɾɔ ja:nɛ jɛʋləʋi t̪ʻaŋ:ɪɦɔɽɪkˑɯ̃]
(How much water will an elephant drink?)

(17) 

[ni: jɛpˑəpˑo:ɾɛ]
(when are you going?)

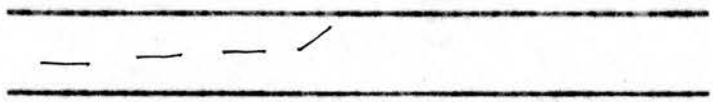
(18) 

[ɪn:ɪkˑɪ jɛn:ə t̪ʻe:ðɪ]
(what is the date to-day?)

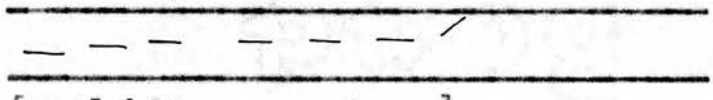
(19) 

[ne:t̪ˑɪkˑɛ jɛn:əβaŋ:ɪnɛ]
(what did you do yesterday?)

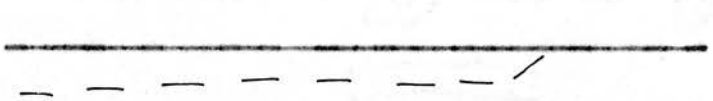
11.4.8 III The same Wh- Questions, asked as if surprised or angered by the replies received:-

(20) 

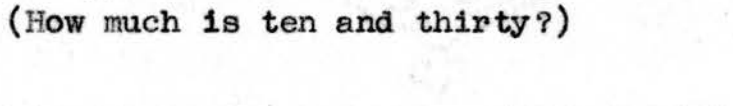
[wom pe:rɛn:ə] (what's your name?)

(21) 

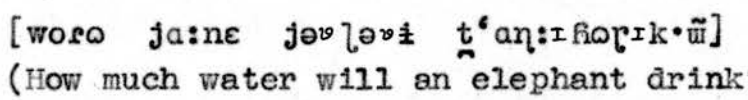
[na:lɛkʰɪ əŋgɛβo:rɛ]
(where are you going to-morrow?)

(22) 

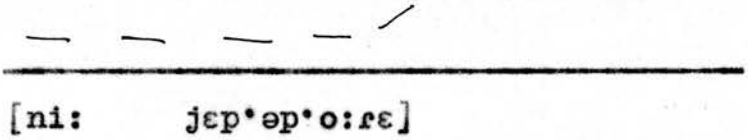
[pʻat̪:ɯ̃ mɔpʰəðɯ̃ jɛɒləɒɨ]
(How much is ten and thirty?)

(23) 

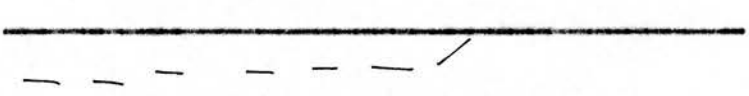
[woɾɔ ja:nɛ jəɒlɔɒɨ t̪ʻaɳ:ɪɸɔɽɪkʰɯ̃]
(How much water will an elephant drink?)

(24) 

[ni: jɛpʰəpʰo:rɛ]
(when are you going?)

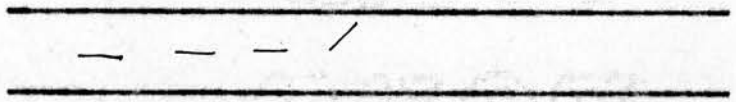
(25) 

[ɪn:ɪkʰɪ jɛn:ə t̪ʻe:ðɪ]
(what is the date to-day?)

(26) 

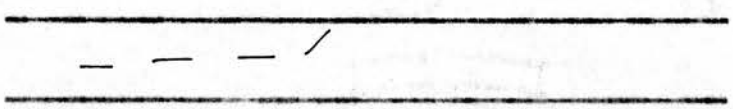
[ne:t̪ʰɪkʰɪ jɛn:əβaɳ:ɪnɛ]
(what did you do yesterday?)

11.4.9 IV "Yes-no" Questions which do NOT end with an interrogative particle.

(27) 

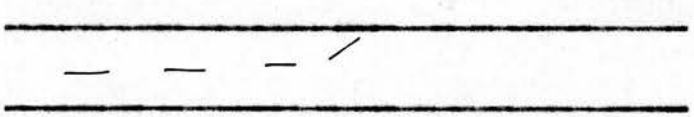
[ap:a: ɪl:ɛ]

(Isn't father here?)

(28) 

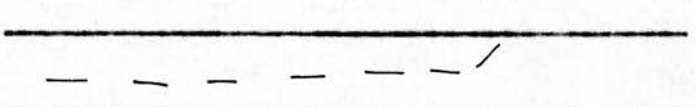
[man:ɪ ɪl:ɛ]

(Isn't elder sister-in-law here?)

(29) 

[roʈ:ɪ ɪl:ɛ]

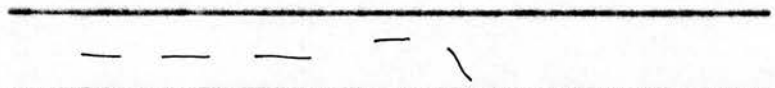
(Isn't there any bread?)

(30) 

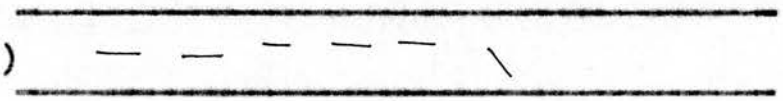
[pʻɷsʈəɦÃ ɪŋgɛ ɪl:ɛ]

(Isn't the book here?)

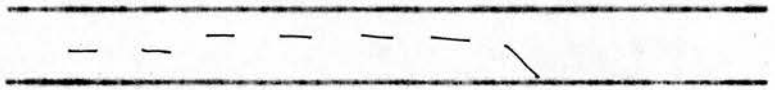
11.4.10 V "Yes-no" Questions which end with an interrogative particle.

(31) 

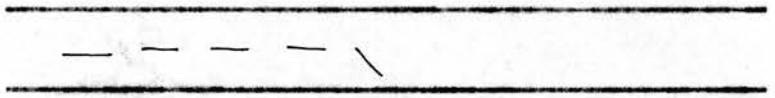
[ɑp:ɑ: ɪl:ɛjɑ:]
(Isn't father here?)

(32) 

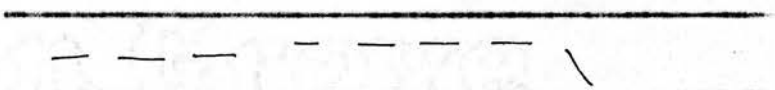
[ɑp:ɑ: ɪɾɨkʲɑ:ɾɑ:]
(Is father here?)

(33) 

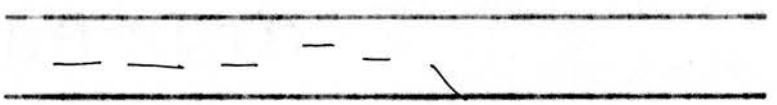
[ɑðɨ ɪŋgɛ ɪɾɨkʲɑ:]
(Is that here?)

(34) 

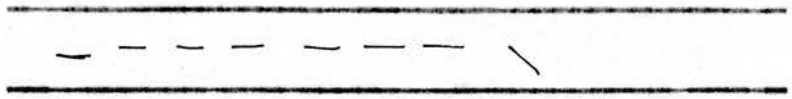
[roʈ:ɪ ɪl:ɛjɑ:]
(Isn't there any bread?)

(35) 

[pʲɔsʈəɦÃ ɪŋgɛ ɪl:ɛjɑ:]
(Isn't the book here?)

(36) 

[ni: ɑŋgɛ pʲo:nəjɑ:]
(did you go there?)

(37) 

[man:ɪ ɪŋgɛ ɪɾɨkʰa:ɭa:]
(Is elder sister-in-law here?)

(38) 

[ne:t̪ʰɪkʰɪ ɑʋənɛpʰa:t̪ʰəja:]
(Did you see him yesterday?)

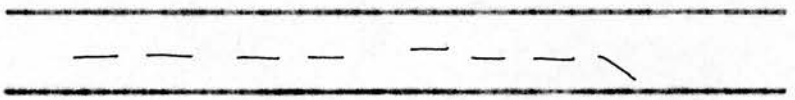
11.4.11 VI Imperative sentences.

(39) 

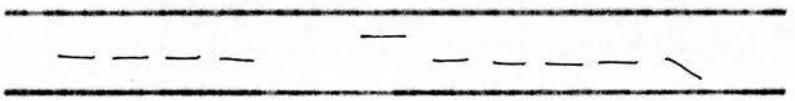
[ʋəɭɨ:lɛβo:] (go out)

(40) 

[gaʋənəma: pa:t̪ʰɨpʰo:]
(Look carefully and proceed)

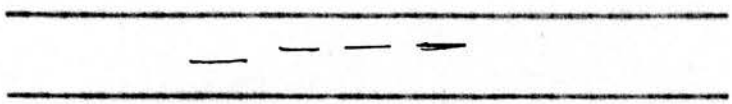
(41) 

[ra:t̪ɾɪ jɛŋgə ʋi:ʈʰɨkʰi ʋa:]
(come to our house to-night)

(42) 

[ɑʋɨnɨkʰi won:ɯŋgɯɽɯkʰa:ðɛ]
(Do not give him anything)

11.4.12 VII Exclamatory sentences

(43) 

[nan:aɾik'e:]
(how very nice !)

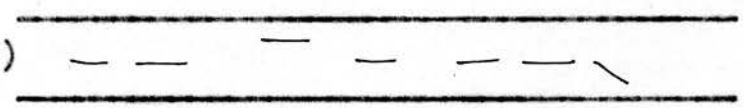
(44) 

[a:t'ʃiɾjəma:ɾik'e:]
(how very surprising !)

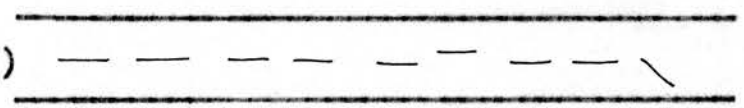
11.4.13 VIII Other types.

(45) 

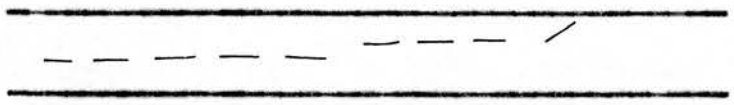
[wonək'i mu:lɛ ɪl:ɛ]
(Haven't you any sense?) - the speaker is very angry

(46) 

[aði ɪŋgɛ ɪɾik'a:]
(is that here?)
(compare No 33 above)

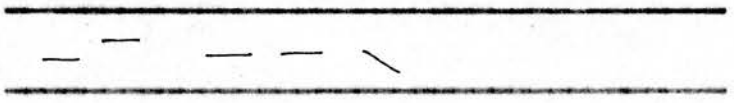
(47) 

[aði ɪŋgɛ ɪɾik'a:βa:ɾi]
(see if it is here) - Ordinary imperative sentence

(48) 

[aðɨ ɪŋgɛ ɪɾɨkʰa:βa:ɾɨ]

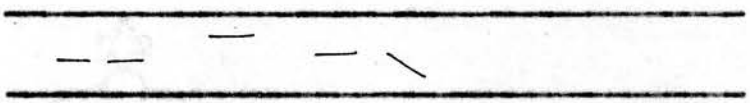
(see if it is here) - same as 47 above, except that here the speaker is anxious to find the thing he is looking for.

(49) 

[aʊÃ jɛn t̪ambɪ]

(He is my younger brother)

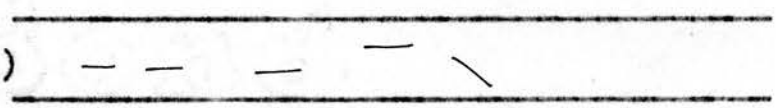
(not the other person standing next to him)

(50) 

[aʊÃ jɛn t̪ambɪ]

(He is my younger brother)

(not the other person's who is standing next to me)

(51) 

[aʊÃ jɛn t̪ambɪ]

(He is my younger brother)

(not cousin)

11.4.14 From these we can come to the following conclusions:-

1) In the various types of sentences we come across two main types of intonation - a falling intonation and a rising intonation.

2) The falling intonation is used in

   (a) assertive sentences

   (b) Wh- questions

   (c) "Yes-no" questions that end in an interrogative particle

   (d) Imperative sentences

   (e) Exclamatory sentences

3) The rising intonation is used in

   (a) "Yes-no" questions which do not end in an interrogative particle. In these types of sentences, intonation alone carries the meaning intended by the speaker. (compare sentences 2 and 27 above)

   (b) Wh- questions and "Yes-no" questions that are asked in surprise, anger or disbelief. For example, in normal speech the question "who are you?" is asked with a falling intonation. If the speaker were to receive a ridiculous or incredible answer, he may just repeat his original question, but this time with the rising intonation.

(c) imperative sentences when the speaker is afraid, anxious or is full of disbelief.

4) The rise or fall (depending upon the intonation used in speech) is invariably in the final syllable of the utterance.

5) In some sentences (see sentence 43, for example) a level tone was observed. But these are too few in the samples checked to come to any valid conclusions.

6) In sentences in which the context requires a word/syllable to be stressed (e.g., in a sentence like "He is my brother") the pitch rises sharply in the syllable that is stressed.

11.4.15 To check the validity of these conclusions arrived at on the basis of listening to sentences and noting down the pitch patterns, spectrograms were made of some of the sentences given above in order to obtain an intonation curve of each of the sentences chosen for analysis. Two types of spectrograms were made:

(a) wide-band spectrograms with frequency range up to 4 K.C.

(b) narrow-band spectrograms with frequency range up to 2 K.C.

11.4.16 Each spectrogram is calibrated with a scale of frequencies at each end of the paper, multiples of 500 cps being marked by a dark bar.

11.4.17 The narrow-band spectrogram shows the continuously changing frequencies of the harmonics, which are all integral multiples of the fundamental frequency.

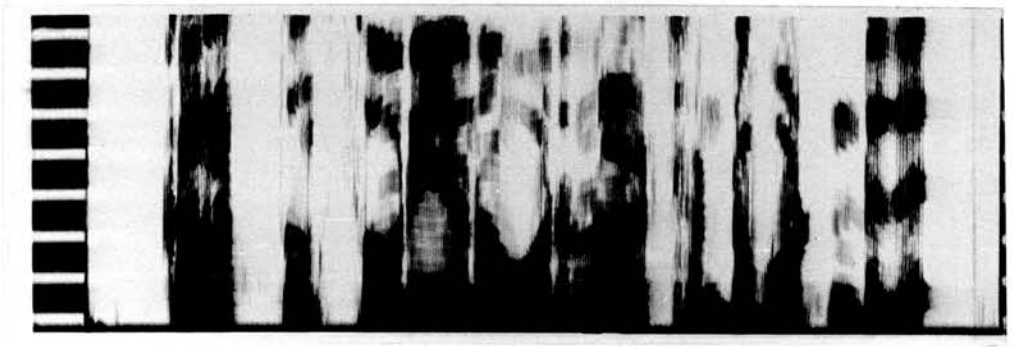
11.4.18 On the narrow-band spectrograms with frequency range up to 2 K.C. the spectrograms were made to a little above 1 K.C. in order to accommodate an amplitude display above the spectrogram. The wide-band spectrogram in each case was used to obtain a segmentation and this segmentation was then transferred to the tracing of the narrow-band spectrogram, so that the intonation curve could be made to correspond precisely with the segment. A few of these pairs of spectrograms, wide band and narrow band, are reproduced later to illustrate the procedure adopted. (see Sgms. 55 to 64).

11.4.19 The intonation curves were obtained by tracing the third harmonic in each case, and these tracings are drawn on a scale which in effect divides all frequencies by three. Thus 450 cps. on the spectrogram becomes 150 cps. on the tracing, 150 cps. on the spectrogram becomes 50 cps. on the tracing, and so on. On this scale, then, the tracing of the third harmonic line represents the fundamental frequency and so is, in effect, the intonation curve.

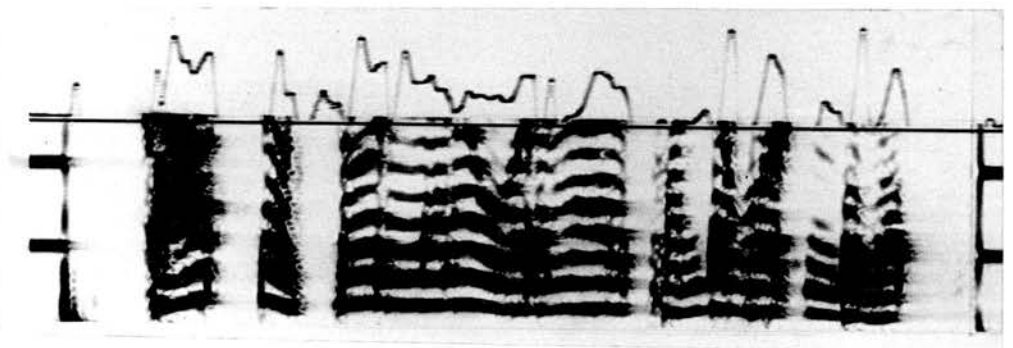
11.4.20 Following the five pairs of wide and narrow

band spectrograms are reproduced the intonation curves of the sentences used in this spectrographic analysis. The intonation curve from the narrow band spectrogram was traced on to a transparent sheet and this is reproduced in the following pages.

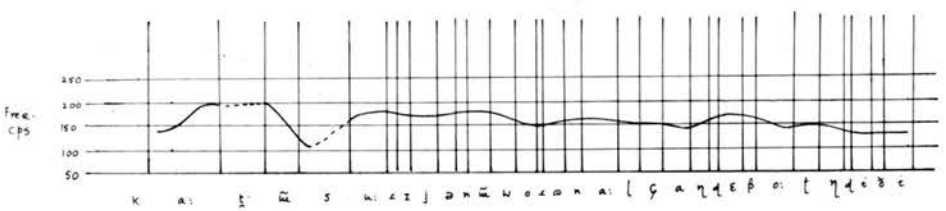
11.4.21 The intonation curves reproduced show that our conclusions regarding (a) the falling intonation (b) the rising intonation and (c) the rise or fall taking place in the final syllable of each sentence are right. But looking at the intonation curves of sentences like [nan:arik•e:] (how very nice !), [a$\underline{\text{ʊ}}$ʋ$\tilde{\text{A}}$ jɛn ṭambɪ] (he is my younger brother) etc., one may think that it might be better to mark these in terms of contours over a tone group. This is a preliminary analysis in terms of levels just like Coustenoble and Armstrong (1934) have done for French.



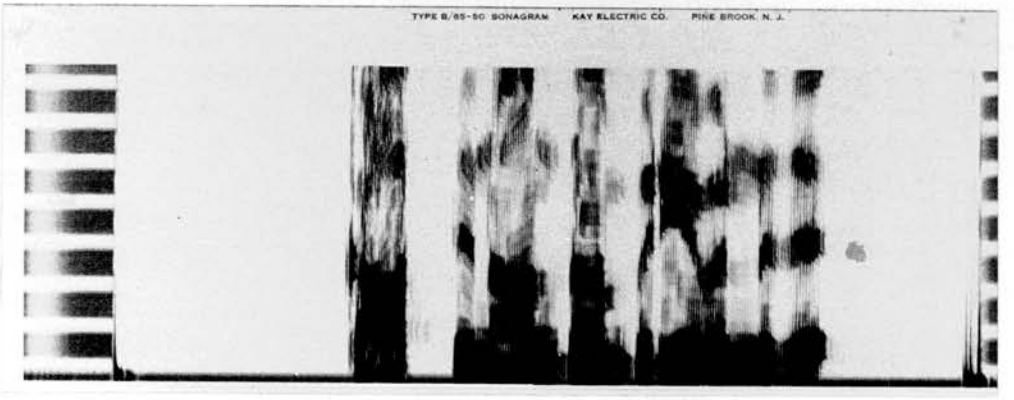
Sgm. 55



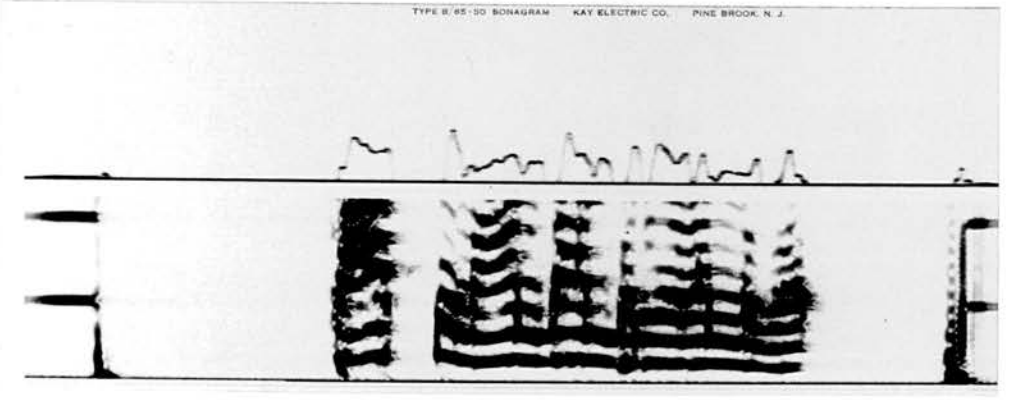
Sgm. 56



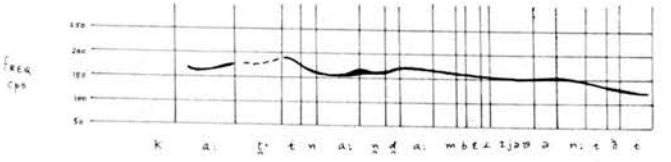
The wind and the sun were disputing
one day



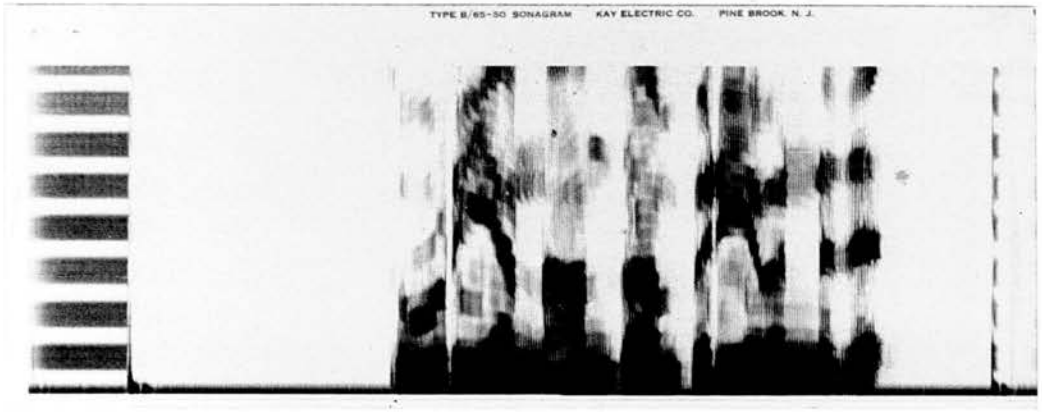
Sgm. 57



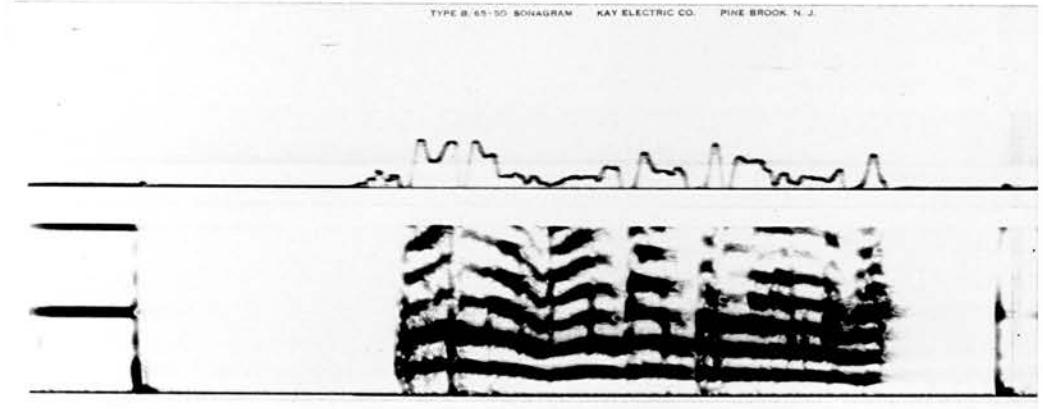
Sgm. 58



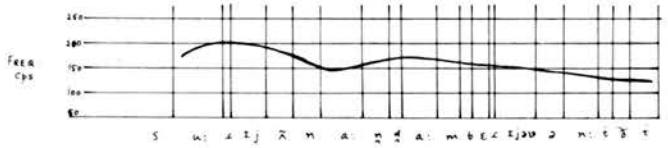
The wind said that he was the stronger.



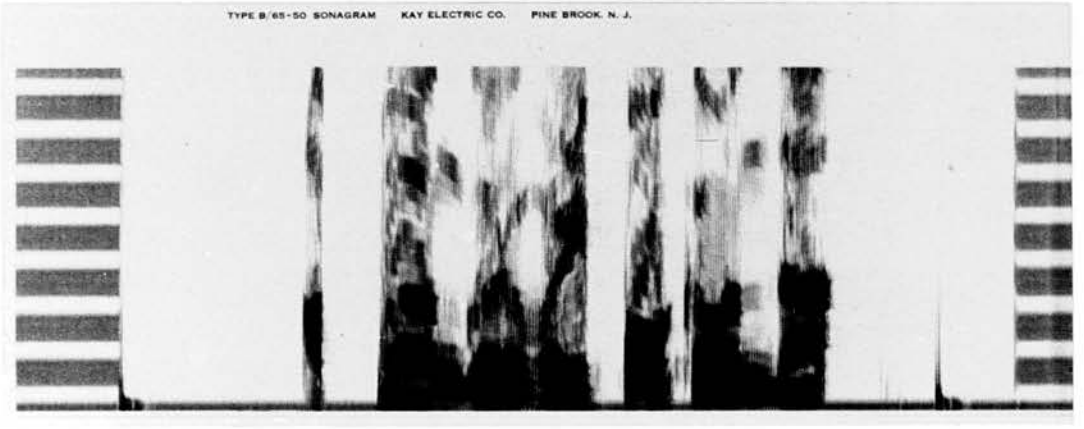
Sgm. 59



Sgm. 60

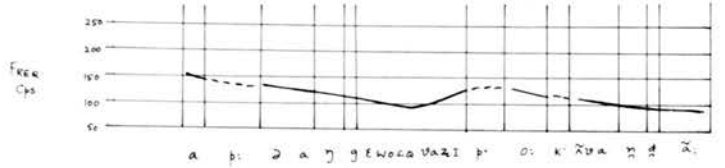


The sun said that he was the stronger.

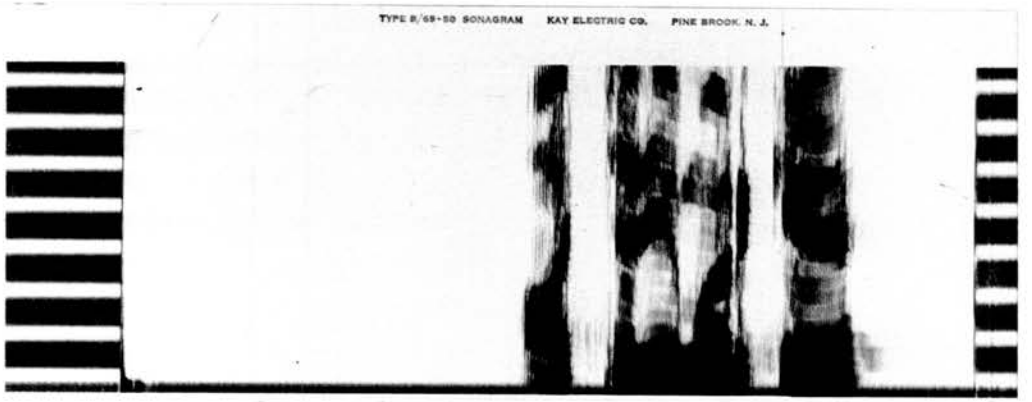


Sgm. 61

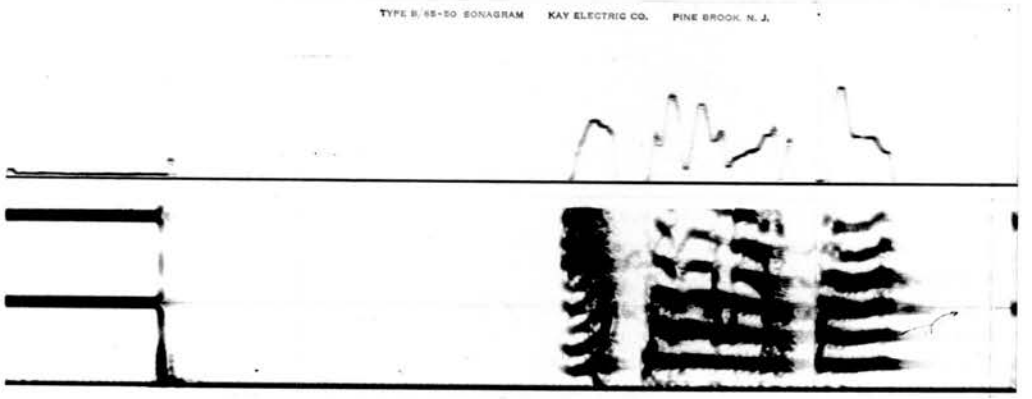
Sgm. 62



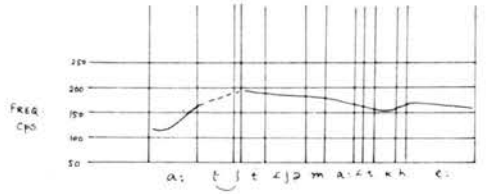
Then a passer-by came there



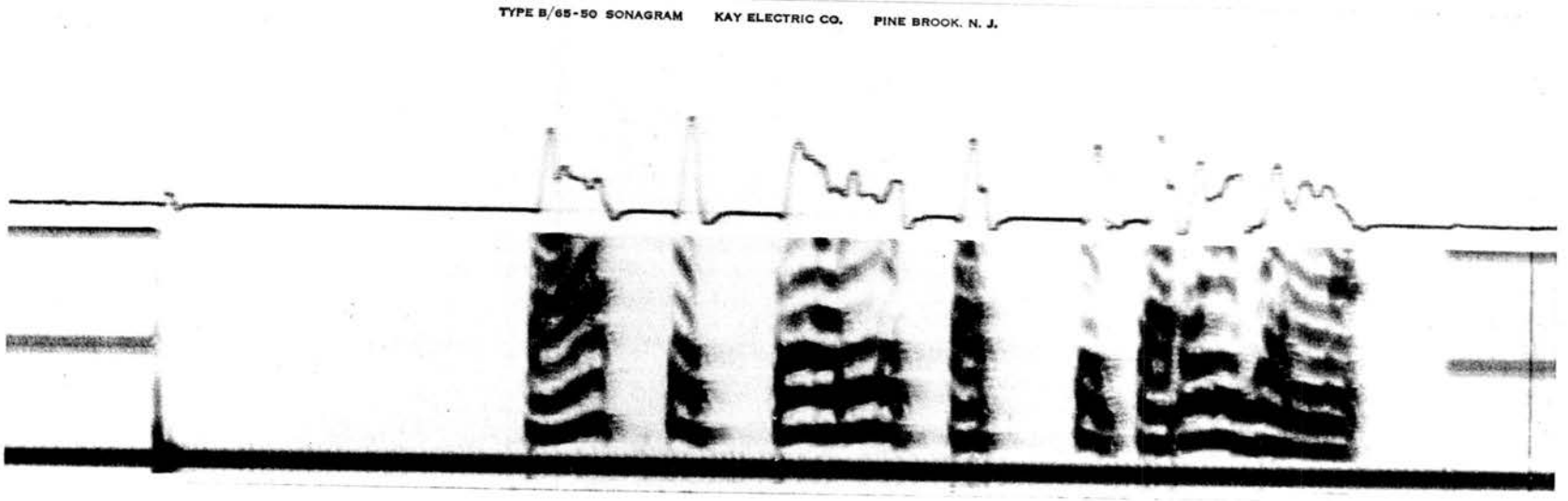
Sgm. 63



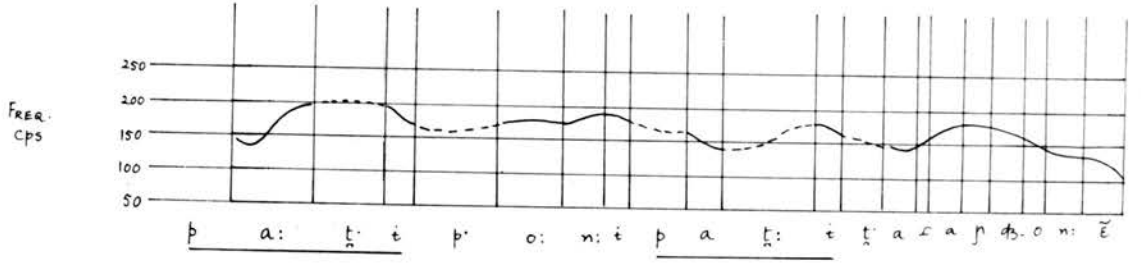
Sgm. 64



How very surprising!

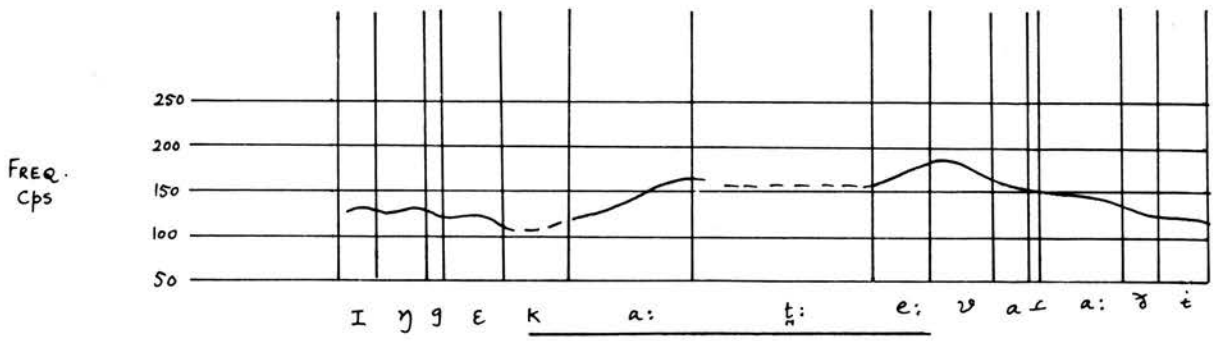


Sgm. 65

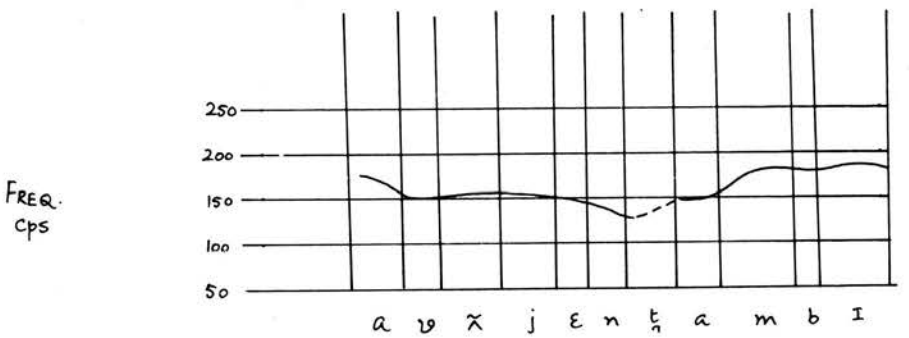


I told him <u>ten</u> times to be <u>careful</u>
while going.

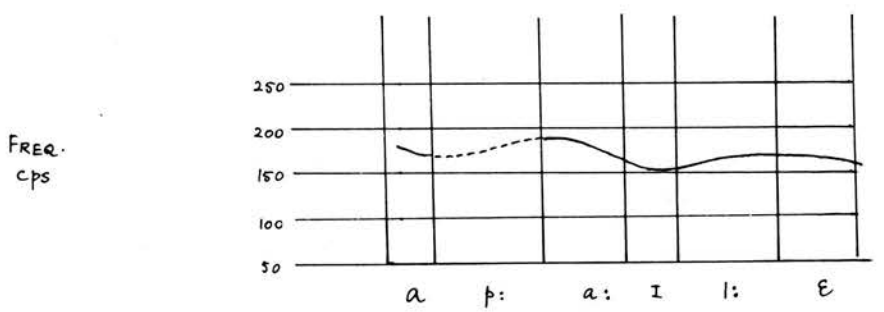
Intonation curve -- assertive sentences



You get absolutely no breeze here

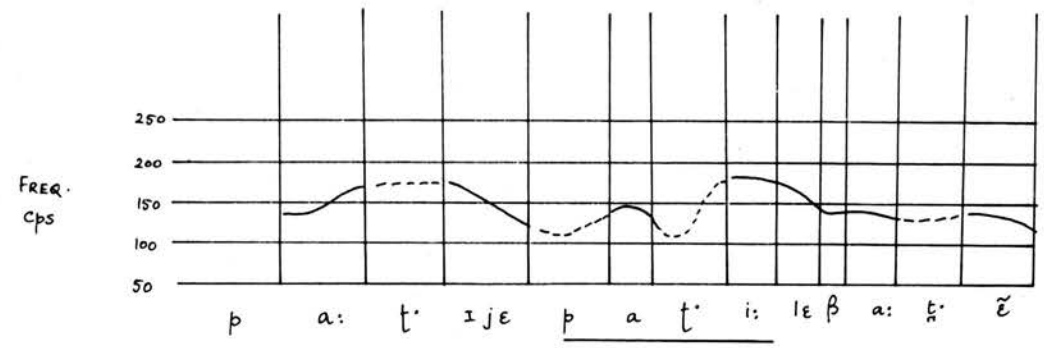


He is my younger brother

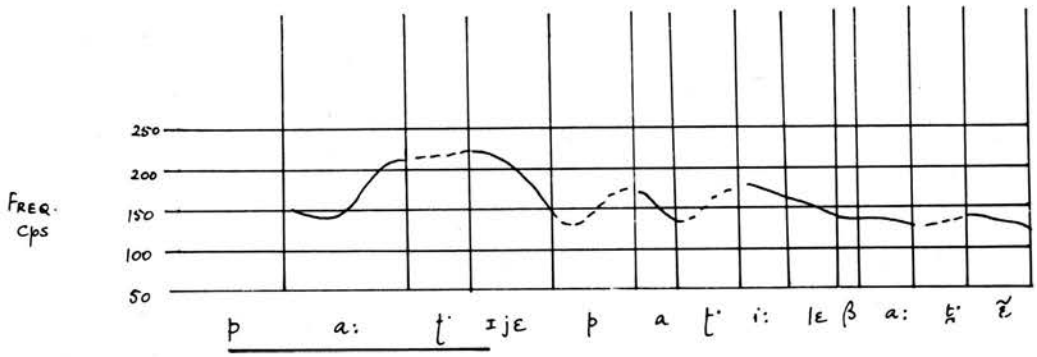


Father is not here.

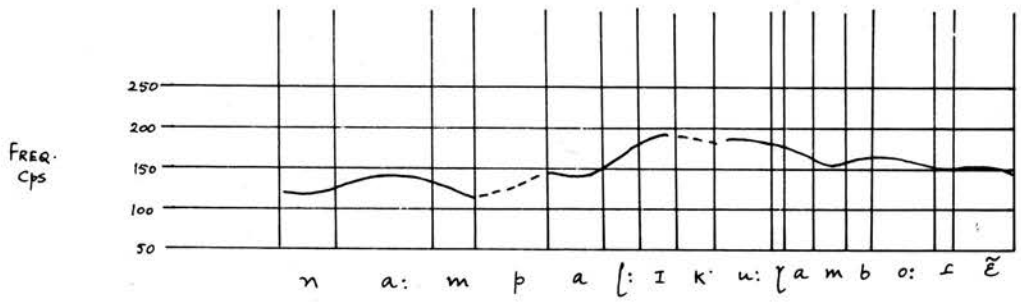
Intonation curve -- assertive sentences



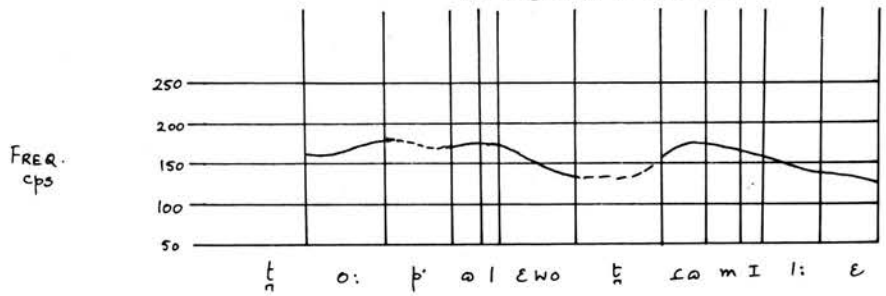
I saw grandmother in the cowshed.



I saw grandmother in the cowshed.

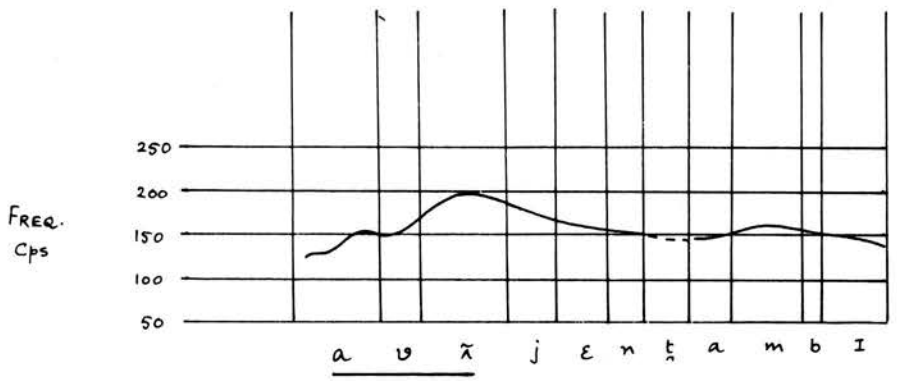


I am going to school.

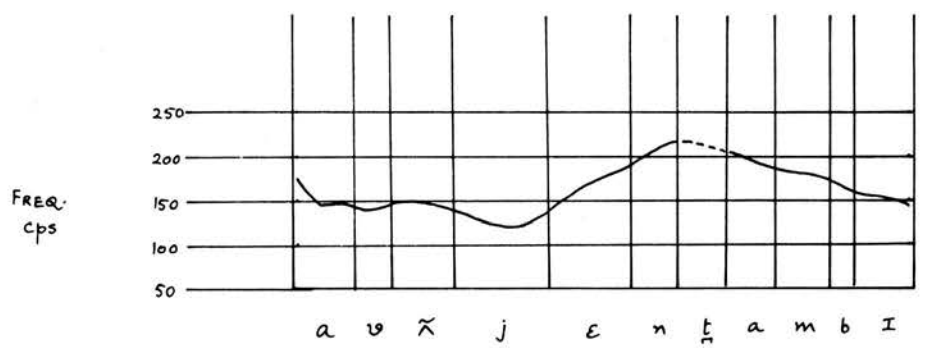


There is no one in the grove.

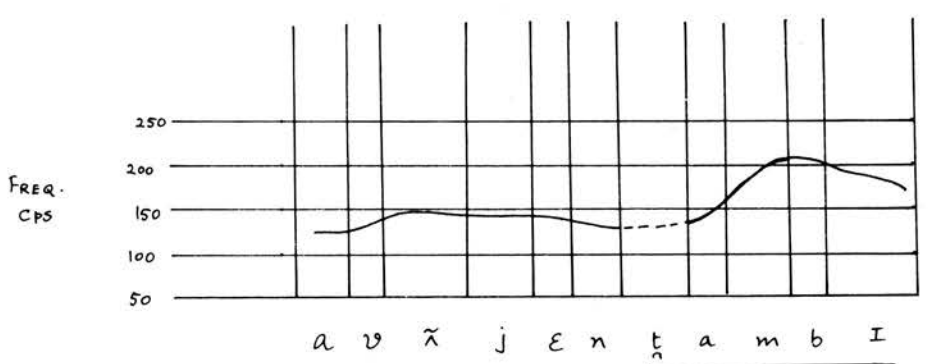
INTONATION -- ASSERTIVE SENTENCES



He is my younger brother.

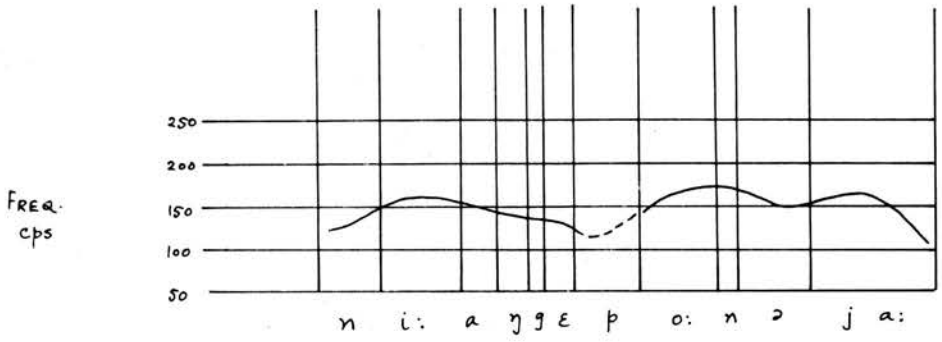


He is my younger brother.

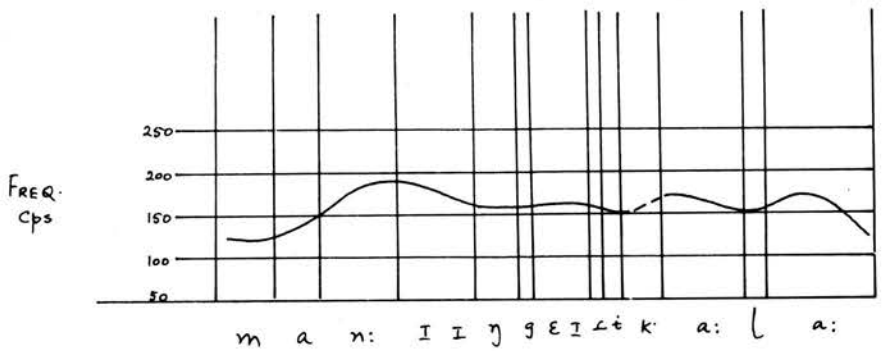


He is my younger brother.

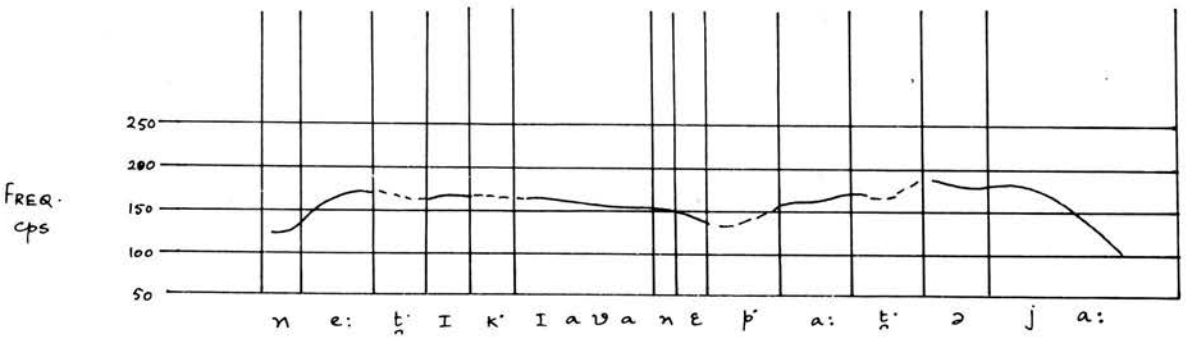
Intonation curve -- Interrogative sentences ending in an interrogative particle.



Did you go there?

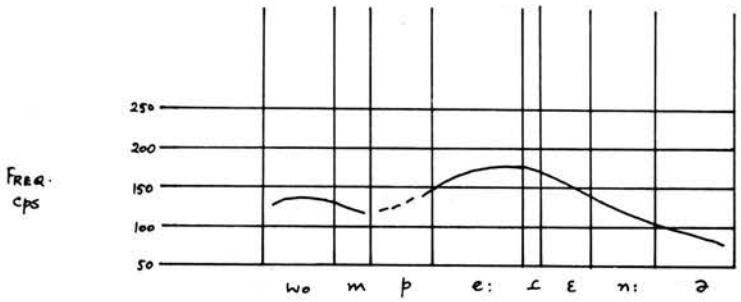


Is elder sister-in-law here?

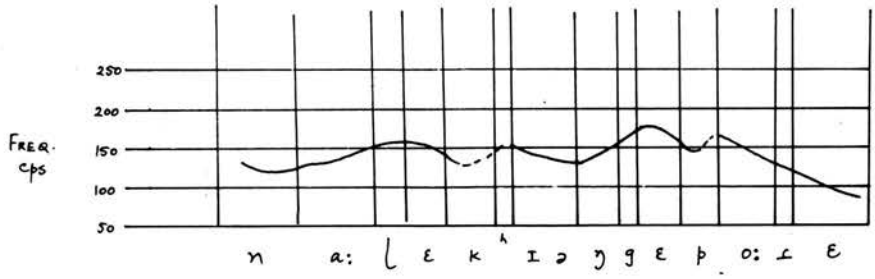


Did you see him yesterday?

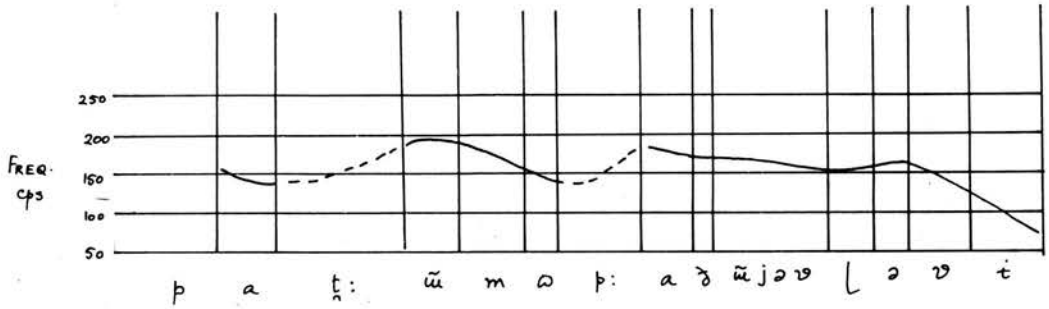
Intonation curve -- Wh- questions



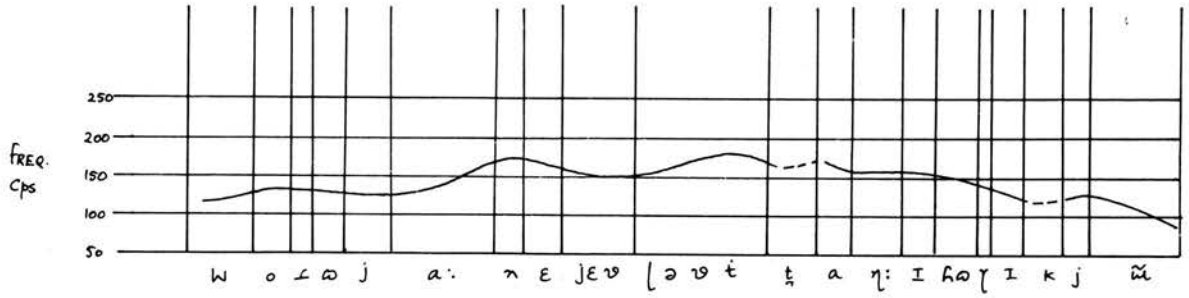
What is your name?



Where are you going tomorrow?

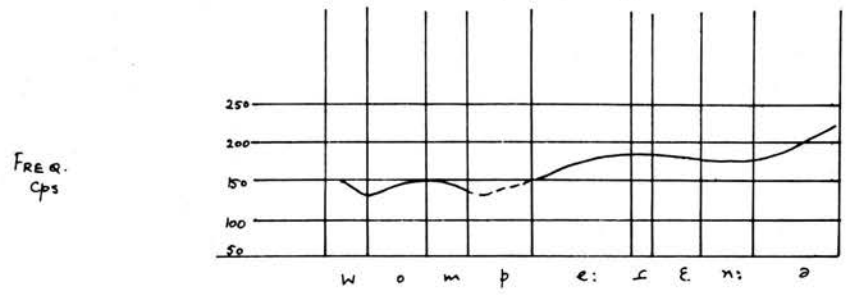


How much is ten and thirty?

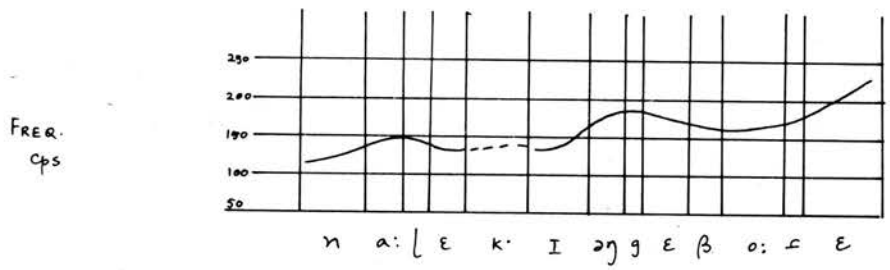


How much water will an elephant drink?

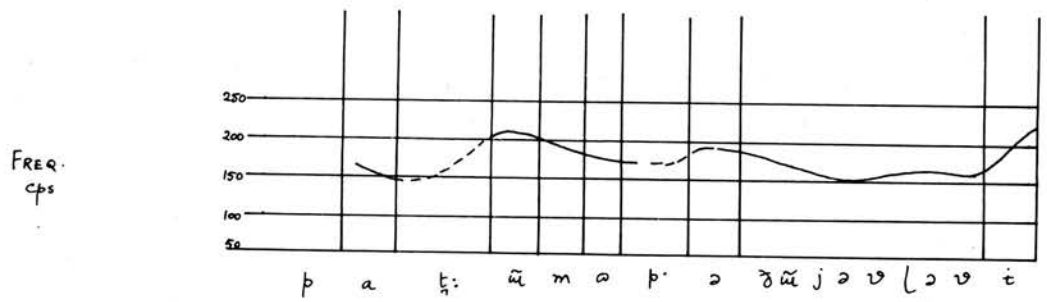
Intonation curve —
Wh- questions asked in anger,
disbelief, surprise, etc.



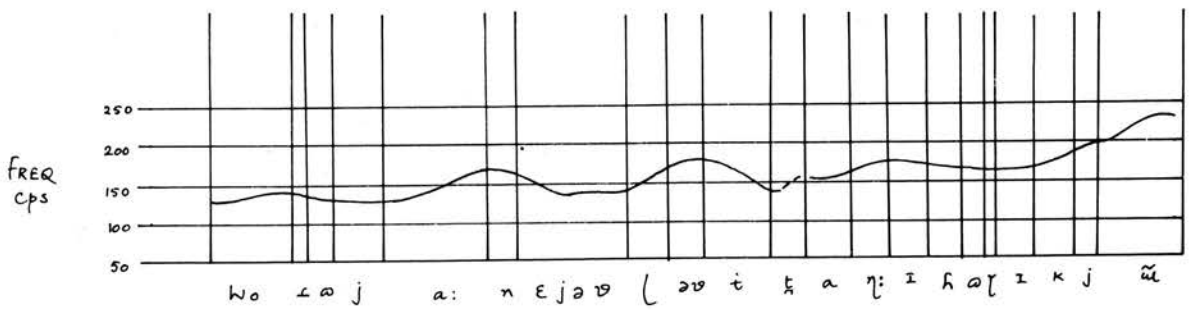
What is your name?



Where are you going tomorrow?

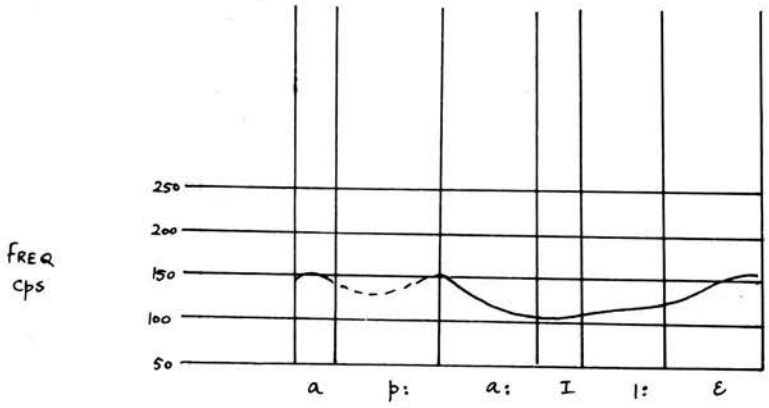


How much is ten and thirty?

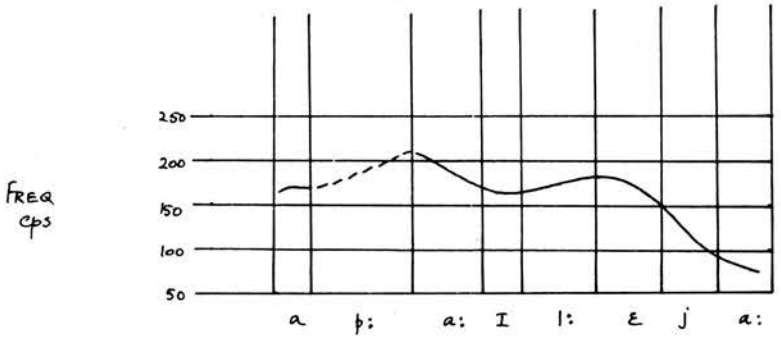


How much water will an elephant drink?

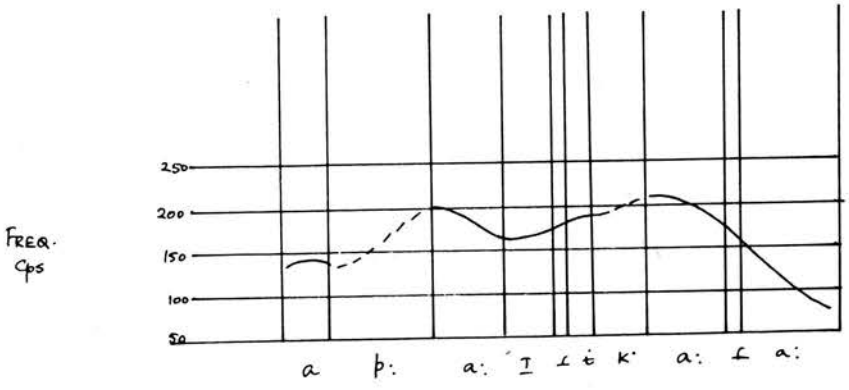
Intonation curve --
'yes/no' questions ending in and not ending in an interrogative particle.



Isn't father here?

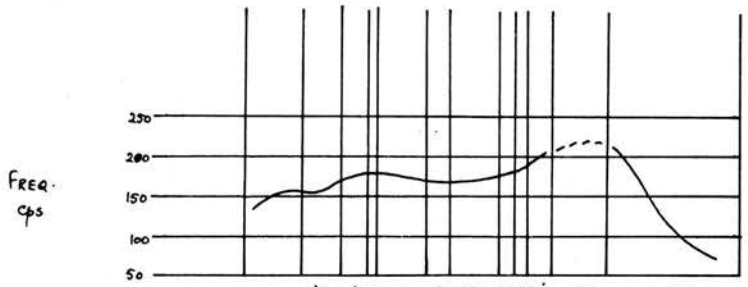


Isn't father here?

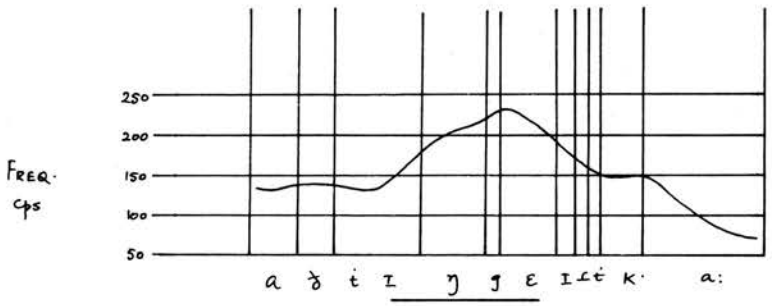


Is father here?

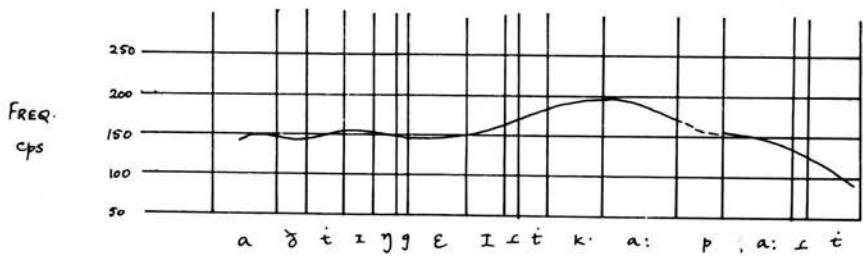
Intonation curve — 'yes/no' questions and imperative sentences.



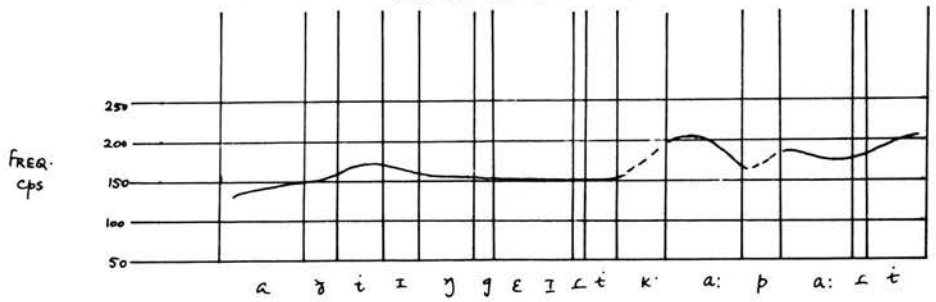
Is it here?



Is it here?

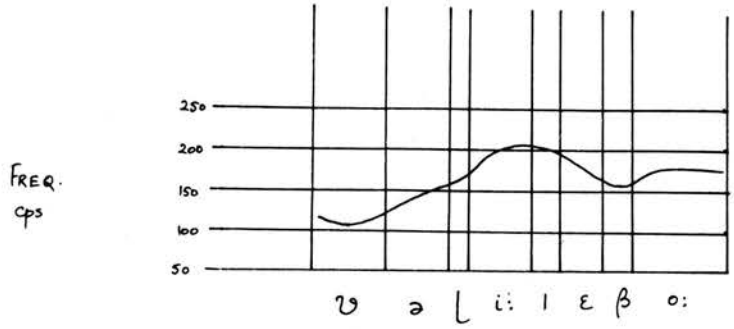


See if it is here.

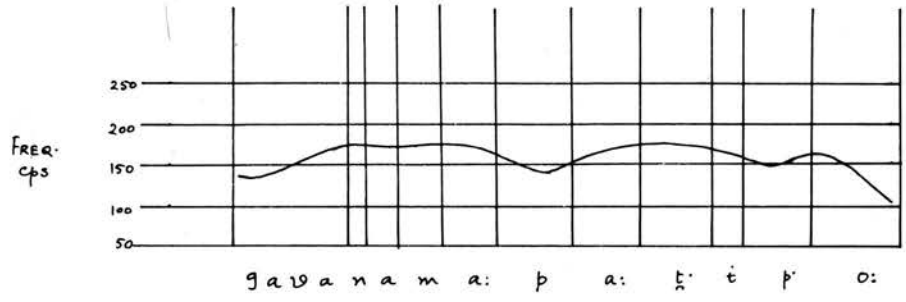


See if it is here.
(said with fear or anxiety)

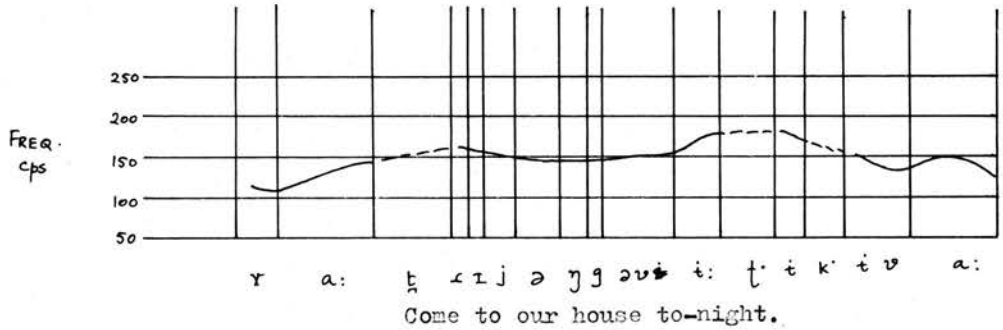
Intonation curve --- imperative sentences.



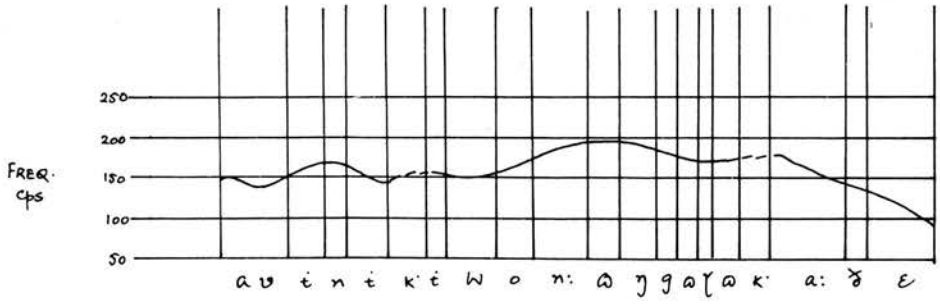
Go out.



Look carefully and proceed

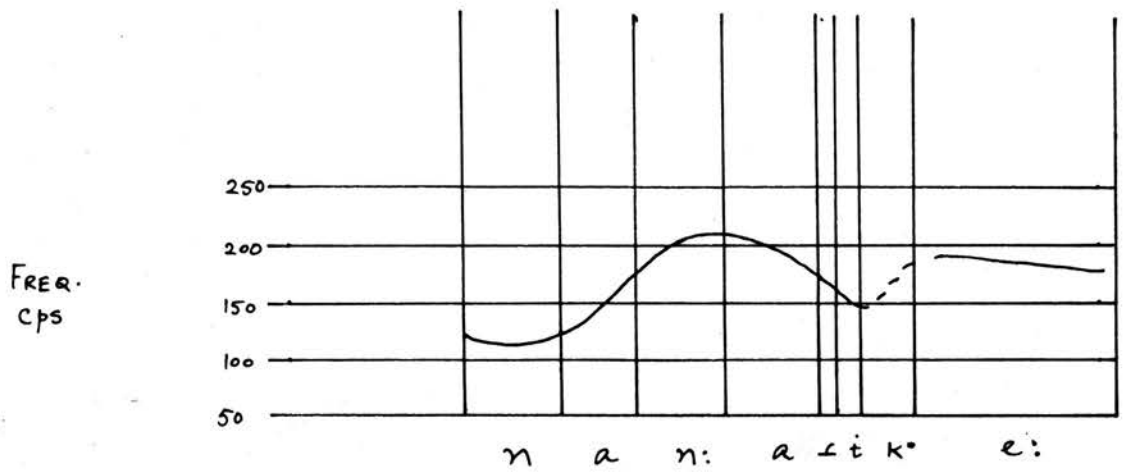


Come to our house to-night.

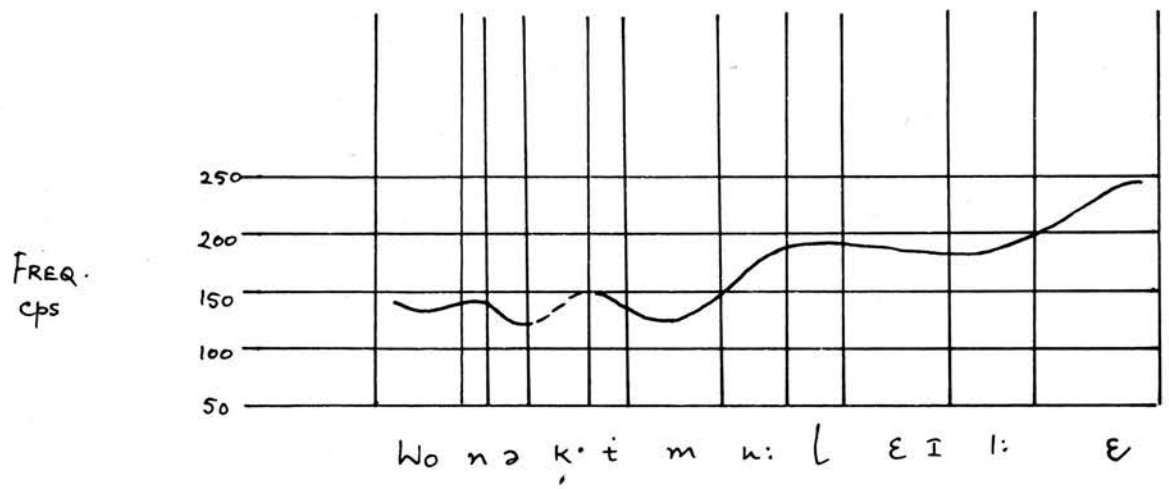


Don't give him anything.

Intonation curve.



How very nice!



Haven't you any sense?
(Said very angrily)

APPENDIX Ia

A few conversations and other utterances of the present writer and his wife. Oblique lines indicate sentence-boundaries.

Relevant to Chapter I.
(see 1.6.9 - 1.6.10)

(pages 563 - 567)

APPENDIX Ia

Conversation I:

Wife: [ɪn:ɪkʰa:ɾʈa:lɛ jɛn:əβaɳ:ɪne:l]

What did you do this morning?

Husband: [pʰe:pʰəɾ pʰaɽɪtʰ͡ʃɛ̃/ apɾÃ kʰaɽɛkʰɪpʰo:j woɾɔ pakɛʈ sɪgaɾɛʈ ʋa:ŋgɪnɛ̃]

I read the newspaper, then went to the shop and bought a packet of cigarettes.

Wife: [ni:ŋge rombə smo:k pʰandɾe:l]

You are smoking too much.

— ••• —

Conversation II

Wife: [pʰe:pʰəɾɨmbe:nɑ:ʋɨŋgɔɽɔŋgo:/ woɾɔ lɛʈʰəɾ ɨzɨðəɳɯ̃]

Give me a (sheet of) paper and a pen. I must write a letter.

Husband: [pʰe:nɑ: əŋge:]

where is the pen?

Wife: [ʈʰe:bl me:lɛ ɪɾɨkʰɨmbɑ:ɾɨŋgo:]

See, it will be on the table

— ••• —

Conversation III:

Husband: [jɛnək•i̯ na:ɭɛk•ɪ li:ʋi̯]

I have a holiday to-morrow

Wife: [jɛn:ə prəjo:ʤənɐ̃/jɛnək•i̯ ɖju:ʈɪ ɪɾik•i̯]

What is the use? I have (to) work to-morrow

Husband: [ni: prəjatnəmbaɳ:i̯/ wonək•ɯ̃ li:ʋi̯ɦəɽət•ʃa: rəɳɖiβe:ɾɯ̃ ʋəɭi:lɛβo:lɑ̃:]

Try, if you get a holiday, too, we can both go out.

Wife: [jɛnək•i̯ a:kʂe:βaɳɛ ɪl:ɛ/ əŋgɛβo:ɾəðɨ̯]

I have no objection. (But) where to go?

Husband: [aða:mbɾəɸnɛ]

That's the problem.

—— ··· ——

Conversation IV:

Wife: [p'ɷðo ʋaɾiʂəmboɾək•əɾəðɨ̯k•oɭ:ɛ rəɳɖɨ̯ɦa:ɾɪjəmbaɳ:əɳɯ̃]

We must do two things before New Year's Day.

Husband: [jɛn:ə]

what (are they)?

—— ···——

Wife: [woɾɔ k'alənɖəɾ ʋa:ŋgənɳ̃/ apɾɑ̃ woɾɔ mɔʈ·ɔma:lɛ ʋa:ŋgənɳ̃]

We must buy a calendar and then a pearl necklace.

— ... —

Conversation V:

Wife [aʋɨnɨk·ɨ aɦəŋga:ɾʌ rombə ʤa:stɪ/ andastɨ ʋandaðɯ̃ aɾʈəmɪl:a:mɛ naɽəndɨk·əɾɑ̃:]

He is very proud. After gaining some status, he behaves in a meaningless way.

Husband: [aʋəŋgəɽək·əɾɑ̃: ajo:gjap·ajə]

Leave him alone, the unworthy man.

— ... —

Utterance I:

[ʤan:al k'aðəʋɛl:ɑ̃: mu:ɽɔ/ k'ɔlɔɾɔ rombə ʤa:stɪja:ɾkɨ]

Close all the windows. It's very cold.

Utterance II:

[nam:ə ɖe:ɕaʈ·ɨlɛ rombap·e:ɾɨk·ɨ mu:lɛ ɪl:ɛ]

Many people in our country have no wisdom.

Utterance III:

[laiʈ jɛɾɪjəl:ɛ/ balbɨ fju:sa:pˈo:tˈ͡ʃo: jɛn:əmo:]

The light does not burn. Don't know if the bulb has fused.

Utterance IV:

[ɪn:ɪkˈɪ a:spat̪ɾi:lɛ rombəkˈaʂʈəma:nə prəsaʋəkˈe:s won:ɑ]

There was a very complicated childbirth case at the hospital to-day.

Utterance V:

[ra:t̪ɾɪ kˈaɾɪ prəma:ðɐ̃/ kɾa:mbɨ je:ləkˈa:jɛl:a:mbo:ʈˈəja:]

The curry to-night was excellent. Did you add cardamoms and cloves to it?.

Utterance VI:

[me:ɾɑ kˈaɽɨða:ɸɨ ɨzɨði:ɾka:/ prəja:ɳɐ̃ saɑɦəɾjəma: ɪɾɨn̪d̪ɨðɑ̃:]

Mehru has written a letter. It seems her journey was comfortable.

APPENDIX Ib

A few conversations and other utterances of unsophisticated Tamil speakers. Oblique lines indicate sentence-boundaries.

Relevant to Chapter I.
(see 1.6.11 - 1.6.12)

(pages 568 - 572)

APPENDIX Ib

1) Motor mechanic to his assistant:-

[ɪn̪d̪ə dʒaːɪɳʈlɛ koɳdʒÃ gɾiːs poːʈˑɨ
apɾʌ ɪn̪d̪ə skɾuːʊɛ naɭːa ʈaiʈ paɳːɨ]

Apply some grease to this joint and then tighten this screw thoroughly.

2) Motor mechanic to customer:-

[ɪn̪d̪ə dʒɪlːaː mɔɭɔ̃ðw̃ sɔt̪ˑɨnaːkˑuːɽə
namːə gaɾaːtʃ maːðɪɾɪ paːkˑə mɔɽʲjaːðɨ
saːɾ]

Even if you go round the entire district, you cannot come across a garage like mine, sir.

3) Waiter to cleaner in a canteen:-

[dʒoːsap ɪŋgɛ ʈeːbɭ kɭiːnbaɳɖaː moðalːɛ]

Joseph, clean this table first.

4) Waiter to customer in a canteen:-

[saːɾ naɭːə haːʈ haːʈ ʋaɽɛ ɪɾɨkˑɨ/
saːpˑɨd̪ɾɨːŋgəɭaː]

Sir, there are hot vadais (a kind of savoury cakes); would you like to eat (some)?

5) barber to customer at the hairdresser's:-

[sa:ɾɨkʲɨ ɪn:a: mɪsɪn kaʈ:a: ɪl:e: sɪsəɾ kaʈ:a:]

Does Sir want a "machine (hair) cut" or a "scissors (hair) cut" ?

6) One attendant to another at the college office:-

(a) [raʈn̪ʌ̃ bɛl aɽɪtʲʃ ja:/ ʈaima:jɪɽɪtʲʃɪ]

Ratnam, have you rung the bell? It's time.

(b) [jɛgza:mɨkʲɨ aɾɛ avəɾðã: ɪɾɨkʲɨðɨ/ jɛl:a: ru:mlɛjw̃ pe:pʲəɾ po:ʈʲɪja:ɽa: moʈ:a:l]

There is just half an hour left for the examination (to commence). Have you kept (writing) paper in all the rooms, you fool ?

7) College attendant to head-clerk:-

[sa:ɾ ɪn̪d̪ə fan woɾk sɛj:əɾðɪl:ɛ/ soʈʲʃɪlɛ ɪn:a:mo: mɪʂʈe:k ɪɾɨkʲɨðɨ/ toʈ:a: ʂa:k aɽɪkʲɪðɨ]

Sir, this (electric) fan doesn't work. There is some defect in the switch. If touched, it gives a shock.

8) One attendant to another about a students' strike:-

[ɪn:a: kandɾa:ʋɪjo: ʈɛɾɪjəlɛ/ po:nə ʋaɾsÃ ɾɛdʒɪsʈa:ɾ ɾɪsɪgne:san paɳ:o:ɳən:ɨ straik paɳ:a:ŋgo:/ ɪndə ʋaɾsÃ ɪn:a:n:ɨ ʈɛɾɪjəlɛje:]

I don't know what nonsense this is. Last year they organised a strike demanding the resignation of the registrar. Don't know what it is this year.

9) Petrol pump attendant to customer:-

[bak ʋi:l:ɛ ka:ʈ'ɨ kɔɳdʒəŋgu:ɽə ɪl:ɛ ɖoɾe:]

There is absolutely no air-pressure in the back-wheel, Sir.

10) road-side cobbler to passer-by:-

[su: pa:lɪs paɳ:əʋa: sa:ɾ]

May I polish your shoes, Sir ?

11) Washerman to customer:-

[su:ʈ·o ɑjɨk·ɑ: ɾɾɨk·ɨðɨŋgə/ ɖɾai kɭi:n sɛj:o:ŋÃ]

(your) suit is dirty (sir). It must be dry-cleaned.

12) Conversation between two women on the bus:-

[ne:t̪·ɨ rɑ:t̪ɾɪ kɑ:p·ərɛ:sɑŋgɑ:ɾÃ laiʈ·ɛl:ɑ̃: ɑʋɪt·ʃɨʈ·ɑ̃:/ u:ɽɛl:ɑ̃: worɛ: ɾɾɨʈ·ɨ]

Last night the corporation people switched off the mains. (My) house was completely dark.

A P P E N D I X II

Lip and jaw position of vowels.

(Frame-by-frame measurements from cine-films)

(Relevant to Chapter IV. See 4.1.23 - 4.1.32)

(Pages 573-623)

Set I

Monosyllables of the structure CV with p as releasing consonant.

Note: (i) All readings are measurements taken from the film analyser. The ratio between the projected size of the face and life-size is 3:4.

(ii) The speed of the film taken is 24 frames per second.

[pi:] (excreta)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	09	00	36	
00	00	09	00	36	
00	00	09	00	36	
26	05	24	00	39	
28	07	24	00	39	
30	08	24	00	41	
31	08	24	00	42	
31	08	24	00	42	
31	08	24	00	42	
31	08	24	00	42	
31	08	23	00	41	
27	06	17	00	39	
22	04	16	00	38	
18	03	15	00	38	
12	02	12	00	36	
00	00	11	00	35	

[pɪ] (name of a letter)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	09	00	36	
00	00	09	00	37	
00	00	09	00	37	
00	00	09	00	37	
16	03	14	00	39	
30	08	24	00	41	
30	11	26	00	43	
30	11	26	00	43	
30	11	26	00	43	
30	10	24	00	43	
28	08	21	00	41	
26	06	19	00	40	
25	04	17	00	39	
17	02	16	00	38	
12	02	13	00	38	
12	02	13	00	38	
09	01	13	00	36	
00	00	10	00	36	
00	00	10	00	35	

[pe:] (name of a letter)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	35	
00	00	09	00	37	
23	05	16	00	41	
30	10	26	00	44	
33	12	29	00	45	
33	12	30	00	46	
35	15	31	00	47	
36	16	30	00	47	
36	16	30	00	47	
36	16	30	00	47	
36	16	30	00	47	
35	13	28	00	45	
34	12	25	00	40	
33	09	22	00	40	
30	06	21	00	39	
30	05	18	00	39	
10	02	18	00	37	
00	00	17	00	37	
00	00	10	00	36	

[pɛ] (name of a letter)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	09	00	36	
00	00	09	00	36	
17	04	14	00	42	
29	11	27	00	47	
32	14	27	00	47	
34	14	29	00	47	
35	14	29	00	47	
35	14	29	00	47	
35	13	27	00	47	
31	11	24	00	47	
31	10	24	00	41	
31	08	22	00	41	
26	07	22	00	39	
22	06	20	00	39	
22	04	18	00	37	
18	03	16	00	37	
13	02	15	00	37	
13	02	13	00	36	
00	00	11	00	36	
00	00	10	00	36	

[pɑ:] (name of a letter)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	08	00	35	
00	00	08	00	35	
22	03	15	00	41	
27	12	26	00	47	
27	14	33	00	48	
29	16	33	00	50	
30	16	34	00	50	
30	16	34	00	50	
30	16	34	00	50	
30	16	31	00	48	
30	14	29	00	45	
29	11	27	00	44	
29	08	23	00	44	
29	07	22	00	41	
28	07	22	00	40	
28	06	19	00	40	
28	04	17	00	38	
23	02	16	00	37	
16	02	12	00	37	
08	01	10	00	36	
00	00	10	00	34	
00	00	10	00	34	

[po:] (go - imp.)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	35	
00	00	09	00	36	
18	01	14	00	40	
16	06	22	02	46	
12	07	25	02	48	
11	09	25	03	50	
11	08	27	03	50	
11	08	28	03	50	
11	08	28	03	50	
11	08	28	03	50	
12	08	27	02	51	
13	08	24	02	49	
16	07	23	01	47	
14	04	20	01	44	
00	00	13	00	40	
00	00	10	00	37	

[po] (name of a letter)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	35	
00	00	10	00	36	
19	00	11	00	37	
15	02	18	01	43	
17	07	24	02	43	
18	09	26	02	43	
18	09	27	02	46	
18	09	27	02	46	
18	09	26	02	46	
17	09	26	02	46	
21	08	24	01	45	
21	08	24	01	45	
22	07	22	00	42	
24	07	22	00	40	
24	05	21	00	41	
16	05	20	00	41	
08	03	18	00	38	
00	02	16	00	37	
00	00	15	00	37	
00	00	12	00	37	

[pu:] (flower)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	11	00	35	
00	00	13	00	36	
13	02	18	00	40	
11	04	21	01	41	
10	05	23	03	41	
06	06	23	03	41	
06	06	23	04	41	
06	05	23	04	41	
06	05	23	04	41	
06	05	22	04	41	
08	05	22	03	41	
12	06	22	02	39	
13	06	22	02	38	
20	08	21	02	38	
23	05	20	00	37	
00	00	15	00	35	
00	00	11	00	35	

[pɷ] (name of a letter)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	12	00	35	
12	03	18	01	37	
11	06	21	02	41	
08	06	22	04	41	
08	06	22	04	42	
08	06	22	04	42	
08	06	21	04	42	
19	06	21	03	42	
21	05	20	02	42	
21	03	18	01	41	
11	01	16	00	39	
00	00	13	00	38	
00	00	11	00	37	

[pa] (name of a letter)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	09	00	36	
00	00	10	00	36	
29	09	27	00	41	
31	16	36	00	42	
31	18	37	00	47	
30	20	37	00	49	
28	19	34	00	50	
28	19	34	00	49	
28	19	34	00	49	
28	18	34	00	49	
28	18	32	00	49	
28	14	29	00	47	
28	11	26	00	45	
27	09	23	00	41	
26	08	22	00	39	
23	06	20	00	38	
22	06	18	00	38	
21	05	18	00	37	
21	04	17	00	37	
20	03	16	00	36	
15	03	14	00	36	
00	00	11	00	36	
00	00	10	00	36	

[pe:] (nonsense syllable)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	08	00	35	
00	00	09	00	35	
00	00	09	00	35	
15	02	12	00	37	
26	07	20	00	42	
29	10	25	00	42	
31	10	25	00	42	
31	11	26	00	42	
32	12	26	00	42	
32	12	26	00	42	
32	12	26	00	41	
30	12	24	00	40	
29	12	23	00	40	
28	09	20	00	40	
25	08	18	00	39	
23	05	17	00	39	
20	03	16	00	39	
12	01	11	00	36	
00	00	10	00	36	
00	00	10	00	35	

[pə] (nonsense syllable)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	08	00	34	
00	00	09	00	35	
00	00	12	00	36	
26	07	21	00	41	
31	10	25	00	42	
31	12	26	00	42	
31	12	26	00	42	
31	12	26	00	42	
31	12	26	00	42	
31	11	24	00	41	
28	09	22	00	41	
27	07	20	00	41	
25	06	17	00	40	
24	04	16	00	39	
19	03	15	00	37	
15	02	15	00	36	
12	02	13	00	36	
12	02	13	00	36	
00	00	12	00	35	
00	00	11	00	35	

[pi:] (nonsense syllable)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	09	00	34	
00	00	09	00	34	
00	00	09	00	35	
26	07	12	00	39	
30	10	20	00	40	
31	11	23	00	40	
31	11	24	00	40	
31	11	24	00	40	
31	11	24	00	41	
31	11	24	00	40	
31	11	23	00	40	
30	10	22	00	40	
30	10	22	00	40	
27	10	21	00	39	
27	10	21	00	39	
25	08	20	00	39	
22	06	18	00	38	
21	05	16	00	38	
19	04	15	00	37	
19	03	14	00	36	
15	02	13	00	36	
14	02	12	00	36	
00	00	12	00	35	

[pɨ] (nonsense syllable)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	08	00	34	
00	00	08	00	34	
00	00	11	00	35	
24	05	16	00	37	
30	10	22	00	40	
30	10	22	00	40	
30	10	22	00	40	
30	10	22	00	40	
29	09	22	00	40	
29	09	21	00	40	
25	07	18	00	38	
24	06	16	00	37	
23	06	16	00	37	
20	05	15	00	37	
20	04	15	00	36	
16	04	15	00	36	
14	04	14	00	36	
14	04	14	00	35	
..	..	12	00	35	
..	..	12	00	34	
..	..	10	00	34	

Set II

Disyllabic words with the vowels

in initial position.

[i:rɐ̃] (dampness)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	12	00	35	
00	00	14	00	36	
21	07	17	00	38	
24	09	20	00	39	
24	09	21	00	41	
25	09	22	00	41	
26	09	23	00	41	
28	09	23	00	41	
29	09	23	00	41	
30	09	24	00	42	
30	09	24	00	41	
30	09	24	00	41	
30	09	24	00	41	
30	09	24	00	41	
28	09	24	00	41	
27	09	24	00	41	
27	09	24	00	41	
27	09	24	00	41	
24	09	22	00	41	
22	08	21	00	41	
22	08	21	00	40	
20	07	20	00	39	
19	06	19	00	39	
19	05	18	00	38	
18	03	15	00	37	
15	02	15	00	37	
14	02	14	00	36	
09	02	12	00	35	
06	01	11	00	35	
00	00	11	00	35	

[ɪɾɨ] (stay - imp.)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
04	00	10	00	34	
25	01	13	00	36	
25	08	20	00	38	
28	09	21	00	38	
30	10	22	00	41	
30	10	23	00	43	
30	10	24	00	43	
30	10	24	00	43	
28	09	24	00	41	
28	09	23	00	40	
28	09	23	00	40	
28	09	23	00	41	
28	09	23	00	41	
28	08	22	00	41	
26	08	22	00	41	
24	07	20	00	41	
22	04	19	00	40	
18	03	18	00	38	
10	02	14	00	36	
00	02	14	00	35	
00	00	12	00	35	

[je:ɾɪ] (lake)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	11	00	34	
07	01	16	00	37	
26	09	19	00	40	
27	09	21	00	40	
28	10	22	00	41	
29	12	24	00	43	
32	14	27	00	45	
34	14	29	00	45	
34	14	29	00	45	
34	14	29	00	45	
34	14	29	00	44	
34	14	29	00	43	
32	12	27	00	43	
32	11	27	00	43	
32	11	27	00	42	
32	11	25	00	42	
32	11	25	00	42	
30	11	24	00	41	
30	10	24	00	41	
30	10	22	00	41	
29	09	20	00	38	
26	05	16	00	37	
24	05	15	00	37	
18	05	13	00	36	
07	03	13	00	36	
00	00	12	00	35	

[jɛɾɪ] (throw - imp.)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	13	00	35	
09	02	16	00	37	
25	08	21	00	39	
25	09	23	00	39	
27	09	25	00	42	
29	11	27	00	44	
31	13	28	00	45	
33	14	28	00	45	
33	14	28	00	45	
33	14	27	00	45	
31	12	26	00	43	
31	12	26	00	43	
29	12	26	00	43	
29	11	26	00	43	
29	11	25	00	43	
28	11	24	00	43	
28	10	22	00	42	
27	10	21	00	41	
23	08	19	00	40	
23	07	18	00	40	
21	06	17	00	39	
19	03	16	00	37	
07	02	14	00	36	
00	00	12	00	36	
00	00	11	00	35	

[a:ɾi] (six)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	11	00	35	
12	03	15	00	37	
25	09	20	00	40	
28	09	22	00	42	
28	09	25	00	44	
29	10	25	00	46	
29	12	27	00	48	
30	14	29	00	49	
30	15	31	00	49	
30	16	33	00	49	
30	16	33	00	49	
30	16	33	00	48	
30	16	33	00	46	
29	12	28	00	45	
28	10	26	00	43	
28	09	24	00	42	
25	09	23	00	42	
25	08	22	00	40	
24	08	20	00	38	
23	05	18	00	37	
15	02	15	00	35	
00	00	14	00	35	
00	00	10	00	35	

[wo:rɐ̃] (corner)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	35	
00	00	14	00	35	
18	04	17	00	37	
16	07	19	00	38	
16	08	23	00	42	
16	08	25	03	44	
15	08	26	03	46	
12	07	27	03	47	
11	07	28	03	48	
11	07	28	03	48	
11	07	28	03	48	
11	07	28	03	48	
11	06	27	03	47	
12	05	25	03	44	
12	05	25	02	46	
17	10	25	02	45	
19	10	25	01	45	
21	10	25	01	44	
21	10	24	00	44	
20	09	22	00	41	
20	06	19	00	40	
17	04	17	00	38	
10	02	12	00	35	
00	00	10	00	35	

[worɷ] (a, one)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	11	00	35	
19	04	18	00	38	
22	07	20	00	40	
20	08	20	01	41	
17	08	22	01	42	
16	08	24	01	44	
16	08	26	02	45	
16	08	26	02	45	
16	07	26	02	45	
16	07	25	02	45	
16	07	24	02	45	
15	06	23	02	44	
15	05	24	03	44	
12	04	24	04	44	
09	04	24	04	44	
09	03	23	04	43	
09	03	23	04	43	
09	03	21	04	41	
07	03	21	04	41	
06	03	20	04	40	
..	..	20	03	40	
..	..	18	03	38	
..	..	17	02	38	
..	..	15	02	38	

N.B. Could not investigate further because of the interference of the index finger indicating the end of the word. (See 4.1.23, page 140).

[u:ɾɷ] (town)

Width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
02	02	17	00	37	
08	03	18	02	38	
07	03	19	02	38	
06	04	20	03	39	
05	05	20	04	40	
05	05	21	04	42	
05	05	22	04	42	
05	05	22	04	42	
05	05	22	04	42	
05	06	22	04	41	
05	06	22	04	41	
05	06	21	04	41	
05	06	21	04	40	
05	05	20	03	38	
04	04	18	02	36	
03	03	14	02	35	
..	03	11	01	35	
..	..	10	00	34	

[ɑɾɪ] (peel - imp.)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	35	
00	00	11	00	35	
04	02	17	00	37	
20	07	20	00	39	
19	08	22	00	39	
18	09	22	02	42	
14	08	23	02	42	
08	06	20	03	42	
06	06	20	04	43	
06	06	21	04	43	
06	06	21	04	43	
06	06	21	04	43	
06	08	21	03	43	
06	08	22	01	44	
09	08	25	01	45	
25	10	25	00	45	
25	10	26	00	45	
25	10	26	00	45	
25	10	26	00	45	
27	10	26	00	44	
24	08	25	00	42	
24	07	24	00	40	
23	05	20	00	37	
16	02	16	00	35	
00	00	12	00	35	
00	00	10	00	35	

[aɾɛ] (half)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	11	00	34	
00	00	11	00	34	
00	00	13	00	35	
00	00	14	00	36	
14	07	19	00	38	
22	10	23	00	41	
23	14	26	00	44	
28	18	30	00	48	
28	18	30	00	48	
28	18	32	00	48	
28	18	32	00	48	
28	18	32	00	48	
28	17	32	00	49	
30	14	32	00	52	
32	14	32	00	52	
32	14	32	00	52	
32	14	29	00	48	
32	13	28	00	46	
32	13	28	00	46	
32	12	28	00	46	
32	10	28	00	46	
32	10	27	00	45	
30	09	25	00	44	
29	07	20	00	39	
27	04	19	00	38	
22	04	15	00	35	
18	02	11	00	35	
10	00	11	00	34	
00	00	11	00	34	

[ə:ɾɨ] (climb - imp.)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	13	00	35	
17	04	18	00	37	
24	08	23	00	40	
25	09	24	00	41	
29	10	25	00	42	
30	11	25	00	42	
30	11	25	00	42	
30	11	25	00	42	
30	11	24	00	42	
30	11	24	00	42	
30	11	23	00	42	
29	10	23	00	41	
28	10	23	00	41	
28	10	23	00	41	
28	10	23	00	40	
26	08	23	00	40	
23	07	21	00	39	
21	06	19	00	37	
20	05	17	00	37	
12	03	16	00	36	
10	02	14	00	36	
00	00	14	00	36	
00	00	12	00	35	
00	00	10	00	34	

[ɐt:ɨ] (eight)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	11	00	34	
17	04	17	00	37	
24	08	21	00	39	
27	09	21	00	41	
28	11	23	00	42	
29	11	25	00	42	
30	11	25	00	42	
30	11	26	00	42	
30	11	26	00	42	
30	11	26	00	43	
30	11	26	00	43	
30	11	25	00	43	
29	10	25	00	43	
29	10	25	00	43	
29	10	25	00	43	
25	09	24	00	40	
25	09	22	00	40	
25	09	22	00	40	
24	07	22	00	39	
22	07	21	00	38	
21	05	20	00	38	
20	04	19	00	38	
16	04	19	00	37	
14	03	16	00	36	
12	02	14	00	35	
08	02	12	00	35	
08	02	12	00	35	

[i:ʈ·ɪ] (spear)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	11	00	34	
09	01	13	00	35	
14	02	15	00	36	
21	06	18	00	38	
24	06	20	00	39	
25	08	20	00	39	
28	08	20	00	40	
29	08	20	00	41	
29	09	22	00	42	
29	09	22	00	42	
29	09	22	00	42	
29	09	22	00	42	
29	09	22	00	42	
27	09	22	00	42	
27	09	22	00	42	
27	09	22	00	42	
27	09	23	00	42	
27	09	23	00	42	
28	09	23	00	42	
29	09	23	00	42	
29	11	23	00	42	
29	10	23	00	42	
29	10	23	00	42	
29	10	23	00	42	
28	08	22	00	41	
27	08	20	00	40	
24	06	19	00	39	
21	04	18	00	37	
19	03	15	00	36	
12	02	13	00	35	
00	00	11	00	35	

[ɨʈ:ɨ] (having placed)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	35	
09	01	13	00	38	
20	05	18	00	38	
22	07	21	00	39	
25	10	21	00	40	
29	10	22		40	
29	10	22	00	40	
29	10	22	00	40	
29	10	22	00	40	
29	10	22	00	40	
29	10	22	00	40	
29	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
28	09	22	00	40	
27	07	21	00	40	
25	06	21	00	39	
25	05	19	00	38	
25	03	19	00	37	
25	02	16	00	36	
17	02	16	00	35	
..	..	15	00	35	
..	..	14	00	34	
..	..	11	00	34	
..	..	10	00	34	

Set III

Disyllabic words with the vowels in medial position.

(Only the vowels in the I syllable of each word has been taken into account for this analysis.)

[ʈi:rpɨ] (judgment)

	width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
	m.m.	m.m.	m.m.	m.m.	m.m.	
	00	00	12	00	34	
	00	00	13	00	35	
	23	05	18	00	39	
	24	07	20	00	40	
	26	08	21	00	40	
	26	08	21	00	40	
	26	08	23	00	41	
ɻt	26	08	23	00	41	
	28	08	23	00	41	
	28	08	23	00	42	
	29	08	23	00	42	
	30	08	23	00	42	
i:	30	08	23	00	42	
	30	08	23	00	42	
	30	08	23	00	42	
	30	08	23	00	41	
	30	08	23	00	38	
	29	08	23	00	39	
ɾ	27	07	22	00	38	
	27	07	22	00	38	
	25	07	21	00	37	
	25	05	20	00	37	
	22	05	11	00	33	
	00	00	11	00	33	
p	00	00	10	00	33	
	00	00	10	00	33	
	18	01	15	00	35	
	28	08	21	00	35	
	28	09	24	00	40	
ɨ	26	06	24	00	41	
	22	02	15	00	39	
	00	00	11	00	36	
	00	00	11	00	34	

[t̪ʻɪɾɪ] (wick)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	11	00	34	
00	00	13	00	35	
25	05	18	00	39	
26	08	23	00	41	
28	09	24	00	41	
t 28	09	24	00	41	
29	09	24	00	41	
29	09	24	00	42	
ɪ 29	09	24	00	42	
29	08	24	00	42	
26	07	24	00	40	
ɾ 26	07	24	00	41	
26	08	23	00	41	
ɪ 28	09	23	00	42	
28	09	23	00	42	
28	09	24	00	42	
28	09	25	00	42	
28	09	25	00	42	
26	07	25	00	40	
26	06	25	00	39	
22	03	19	00	38	
16	02	17	00	35	
00	00	15	00	35	
00	00	12	00	35	

[t̪ʻe:rɨ] (chariot)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	34	
22	04	17	00	38	
25	07	22	00	41	
26	09	24	00	42	
26	09	27	00	42	
26	09	27	00	42	
27	09	27	00	42	
27	09	27	00	42	
27	09	27	00	42	
28	09	27	00	42	
29	09	27	00	43	
31	11	27	00	44	
33	12	27	00	44	
33	13	29	00	44	
34	14	29	00	44	
34	14	29	00	44	
34	14	29	00	44	
34	13	29	00	44	
34	10	25	00	43	
29	10	25	00	42	
29	09	25	00	42	
29	09	25	00	43	
29	09	25	00	43	
29	06	24	00	43	
27	05	19	00	43	
19	02	16	00	41	
15	02	16	00	38	
00	00	12	00	37	
00	00	10	00	35	

[t̪ʻɛɾɨ] (street)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	35	
00	00	14	00	35	
24	08	20	00	40	
24	10	24	00	42	
26	12	26	00	44	
26	12	26	00	44	
ɪt 26	11	26	00	44	
26	11	26	00	44	
28	11	26	00	45	
30	11	28	00	46	
32	12	28	00	46	
ɛ 33	12	28	00	46	
33	13	28	00	46	
ɾ 33	13	28	00	45	
30	13	26	00	46	
30	11	26	00	46	
29	11	25	00	46	
ɨ 29	10	24	00	42	
28	10	24	00	41	
28	09	24	00	41	
28	09	24	00	40	
26	09	24	00	38	
24	06	18	00	37	
15	05	15	00	35	
00	02	13	00	34	
00	00	10	00	34	

[ʧ'a:lɪ] (a chain worn by a married woman)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
23	05	17	00	37	
27	09	22	00	40	
29	11	25	00	40	
29	11	25	00	40	
29	09	24	00	40	
ʧ 29	09	23	00	39	
29	09	23	00	39	
29	09	24	00	39	
29	09	26	00	40	
29	08	28	00	40	
29	12	28	00	41	
29	13	30	00	43	
a: 30	15	32	00	45	
30	15	32	00	48	
30	15	32	00	48	
l 30	15	32	00	48	
30	15	30	00	48	
ɪ 30	12	28	00	44	
30	10	26	00	44	
30	10	24	00	43	
30	10	21	00	42	
27	08	18	00	40	
24	05	16	00	39	
15	02	14	00	37	
12	01	13	00	36	
00	00	11	00	35	
00	00	11	00	35	

[t'o:lɷ] (skin)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	13	00	36	
21	02	18	00	38	
21	08	21	00	40	
19	09	23	00	41	
17	07	23	00	41	
17	07	23	00	41	
16	07	23	01	41	
16	07	23	01	43	
ɔt 15	07	24	01	43	
15	07	24	01	43	
13	07	26	02	48	
12	07	27	02	49	
12	07	27	02	49	
o: 12	07	27	03	49	
12	07	27	03	49	
12	07	26	03	47	
08	06	25	03	47	
l 07	06	23	03	45	
07	06	23	03	43	
07	05	24	03	43	
07	05	24	04	43	
06	05	24	04	42	
06	05	24	04	42	
ɑ 06	05	22	04	42	
06	04	22	04	41	
06	03	22	04	41	
06	03	22	04	40	
06	02	18	03	40	
06	02	16	02	38	
..	..	14	01	36	
..	..	12	00	35	
		10	00	34	

[t'ol:ε] (trouble)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
08	04	14	00	37	
21	10	24	00	41	
21	10	25	00	43	
21	11	25	00	43	
21	11	25	00	43	
21	11	25	00	43	
t 20	09	25	00	43	
' 20	09	25	01	43	
19	09	23	01	44	
19	09	23	01	44	
18	08	23	02	46	
18	08	24	02	47	
17	08	26	02	47	
o 17	08	26	02	47	
17	08	26	02	47	
17	08	26	02	47	
17	08	26	02	46	
l 17	09	27	01	46	
17	10	27	01	46	
17	10	28	00	46	
20	11	28	00	47	
25	12	30	00	48	
27	13	31	00	48	
30	13	31	00	48	
32	13	31	00	48	
ε 32	12	31	00	47	
32	11	29	00	40	
27	08	28	00	37	
23	04	18	00	35	
12	01	14	00	35	
00	00	12	00	34	
00	00	10	00	34	

[t'u:lɪ] (cloth-cradle)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
16	00	11	00	35	
16	07	21	00	40	
16	07	24	00	42	
15	07	24	00	42	
14	07	24	01	42	
12	07	23	01	41	
t 10	07	22	01	41	
09	07	21	02	40	
08	07	20	02	40	
07	06	20	02	39	
06	06	20	04	39	
06	05	21	04	40	
u: 06	05	21	04	40	
06	05	21	04	41	
06	05	22	04	41	
06	05	22	04	41	
l 07	05	22	04	41	
18	07	22	03	42	
28	11	24	03	42	
ɪ 31	12	27	02	42	
31	12	28	00	42	
31	12	28	00	39	
28	12	28	00	39	
23	09	26	00	39	
19	06	24	00	37	
12	03	19	00	37	
00	01	18	00	36	
00	00	12	00	35	

[t̪ʻɔlɪ] (a drop)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	35	
18	07	19	00	40	
18	10	22	00	41	
18	10	22	00	41	
18	10	22	01	41	
18	08	22	02	41	
17	07	20	02	41	
15	06	18	02	41	
13	06	18	02	41	
12	06	18	03	41	
09	06	20	03	42	
07	06	22	03	42	
07	06	22	04	42	
07	06	22	04	42	
11	06	22	04	42	
13	07	21	02	43	
18	11	24	01	45	
25	11	24	00	45	
29	11	24	00	44	
29	11	24	00	43	
28	10	21	00	41	
23	07	19	00	38	
18	05	15	00	36	
12	03	12	00	35	
00	00	11	00	35	

[t̪ʻalɛ] (head)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	11	00	34	
15	03	17	00	37	
22	08	22	00	42	
25	10	24	00	42	
25	13	26	00	42	
25	15	28	00	44	
25	18	30	00	46	
t̪ 27	18	32	00	48	
29	19	33	00	48	
29	19	33	00	49	
a 29	19	33	00	49	
29	18	33	00	49	
l 29	18	33	00	49	
30	18	31	00	49	
31	16	30	00	48	
ɛ 32	16	29	00	46	
32	15	29	00	45	
32	13	29	00	45	
32	12	29	00	45	
32	11	28	00	43	
31	11	26	00	42	
30	10	22	00	40	
29	09	20	00	40	
27	05	17	00	37	
19	03	14	00	36	
15	03	13	00	35	
12	02	11	00	35	
00	00	10	00	34	

[t̪ʻəːlɨ] (scorpion)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	11	00	34	
00	00	11	00	36	
20	04	11	00	36	
26	10	20	00	40	
28	10	22	00	41	
28	10	22	00	41	
t̪ 28	10	23	00	41	
28	11	25	00	40	
30	11	25	00	40	
30	11	25	00	40	
əː 30	11	25	00	40	
30	12	24	00	40	
30	12	24	00	41	
30	10	24	00	41	
30	08	24	00	41	
l 30	07	22	00	41	
30	07	22	00	41	
29	07	22	00	39	
28	09	22	00	39	
28	09	22	00	42	
ɨ 28	10	22	00	42	
28	10	23	00	43	
27	10	26	00	43	
27	09	26	00	43	
26	09	26	00	43	
26	07	26	00	42	
26	06	24	00	42	
25	04	23	00	40	
22	03	20	00	38	
20	02	18	00	38	
18	02	17	00	38	
14	01	17	00	37	
12	00	14	00	36	
00	00	11	00	35	

[t'əlɪ] (sprinkle - imp.)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	10	00	34	
00	00	12	00	35	
00	00	12	00	35	
18	03	17	00	37	
21	06	21	00	39	
21	09	23	00	40	
23	10	23	00	40	
t 23	10	23	00	40	
23	11	23	00	41	
26	11	25	00	41	
28	11	27	00	41	
29	11	27	00	41	
ə 30	11	27	00	41	
30	10	27	00	42	
30	10	27	00	42	
28	10	26	00	42	
l 28	10	26	00	42	
30	11	26	00	41	
30	11	26	00	41	
ɪ 31	11	26	00	41	
31	11	26	00	41	
30	08	24	00	39	
28	06	22	00	39	
25	03	18	00	38	
15	02	14	00	36	
06	00	13	00	35	
00	00	11	00	34	

[t̪ʻɨ:t̪ˑɨ] (sharpen - imp.)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	11	00	34	
00	00	11	00	34	
22	07	20	00	39	
26	09	22	00	40	
26	10	22	00	40	
26	10	22	00	40	
26	10	22	00	40	
26	10	22	00	40	
26	10	23	00	40	
27	10	23	00	40	
28	11	23	00	40	
29	11	23	00	40	
30	11	23	00	40	
30	11	23	00	40	
30	11	23	00	39	
30	11	22	00	39	
30	10	22	00	39	
30	10	20	00	39	
31	08	20	00	38	
31	08	20	00	38	
31	08	21	00	38	
31	09	21	00	38	
30	09	22	00	39	
30	09	22	00	39	
30	09	21	00	39	
30	07	20	00	38	
26	07	19	00	38	
25	06	19	00	37	
15	04	16	00	36	
10	02	15	00	35	
00	00	12	00	34	
00	00	10	00	34	

[t̪ʻɨt̪:ɨ] (scold - imp.)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	11	00	35	
00	00	11	00	35	
11	01	15	00	35	
25	09	20	00	37	
28	11	24	00	40	
28	11	24	00	40	
28	09	24	00	40	
28	09	22	00	40	
27	09	22	00	40	
28	09	22	00	40	
29	09	22	00	40	
29	09	22	00	40	
29	09	22	00	40	
29	09	22	00	40	
29	09	22	00	39	
27	08	21	00	39	
27	08	21	00	39	
27	08	21	00	39	
27	08	21	00	39	
25	06	20	00	39	
24	06	18	00	39	
21	05	18	00	38	
18	05	17	00	38	
18	04	15	00	37	
12	03	13	00	36	
10	01	10	00	35	
00	00	00	00	34	

Diphthongs -- Lips and jaw positions

(measured from cine-films)

Note: (i) All readings are measurements taken from the film-analyser. The ratio between the projected size of the face and life-size is 3:4.

(ii) The speed of the film taken is 24 frames per second.

[p'ai] (bag)

	width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
	00	00	09	00	32	
	00	00	09	00	32	
	17	06	13	00	37	
	26	10	26	00	45	
	28	15	29	00	46	
	28	15	30	00	45	
a	28	15	30	00	45	
	29	12	30	00	45	
	30	12	27	00	44	
	30	12	27	00	44	
i	30	12	27	00	44	
	29	10	20	00	41	
	25	08	20	00	40	
	21	05	17	00	39	
	20	04	15	00	38	
	15	03	15	00	37	
	05	02	12	00	36	
	00	00	12	00	36	
	00	00	10	00	35	

[t̪'ailʌ̃] (medicinal oil)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	11	00	34	
00	00	11	00	35	
10	01	13	00	36	
20	07	20	00	40	
26	09	24	00	41	
27	11	25	00	43	
t̪ 27	12	26	00	43	
27	12	26	00	43	
26	12	26	00	43	
26	12	28	00	44	
26	13	28	00	44	
a 26	13	29	00	45	
26	15	30	00	45	
26	15	30	00	45	
26	15	30	00	45	
26	14	30	00	44	
26	12	28	00	42	
27	12	28	00	42	
28	12	28	00	42	
i 28	12	28	00	42	
28	12	28	00	42	
28	11	28	00	42	
28	11	28	00	42	
l 28	11	28	00	42	
27	10	29	00	42	
27	12	30	00	43	
26	12	30	00	44	
ʌ̃ 26	14	30	00	44	
24	14	30	00	44	
24	14	29	00	40	
24	09	26	00	39	
20	06	20	00	39	
15	05	15	00	39	
08	03	11	00	38	
00	00	10	00	36	
00	00	10	00	36	

[pɑɷ] (nonsense syllable)

width of lip opening	height of lip opening	distance between upper tip of upper lip and lower tip of lower lip	protrusion of upper lip	distance between the jaws	
m.m.	m.m.	m.m.	m.m.	m.m.	
00	00	08	00	31	
00	00	08	00	31	
11	02	12	00	36	
26	11	24	00	46	
ɑ 26	13	29	00	46	
26	13	29	00	46	
11	08	22	01	46	
09	06	22	01	45	
09	06	22	02	45	
ɷ 08	06	21	03	43	
08	06	21	03	43	
14	06	21	03	43	
15	04	19	02	42	
08	02	13	01	42	
05	01	11	00	40	
00	00	10	00	37	
00	00	10	00	36	

[ɑɷʊɛ] (name of a person)

width of lip opening m.m.	height of lip opening m.m.	distance between upper tip of upper lip and lower tip of lower lip m.m.	protrusion of upper lip m.m.	distance between the jaws m.m.	
00	00	10	00	34	
00	00	10	00	34	
11	01	11	00	36	
26	07	14	00	36	
27	09	19	00	41	
27	10	22	00	41	
27	11	23	00	44	
29	12	25	00	46	
27	13	26	00	46	
27	13	27	00	46	
27	14	27	00	46	
27	14	30	00	46	
27	14	30	00	46	
ɑ 27	15	30	00	46	
28	15	32	00	47	
28	16	32	00	47	
23	14	32	00	47	
11	07	32	02	47	
10	06	19	03	45	
08	06	18	04	42	
ɷ 08	06	18	04	42	
08	06	18	04	42	
22	11	28	03	42	
25	12	32	02	48	
ʊ 30	12	30	02	49	
31	12	26	01	49	
ɛ 31	11	22	00	49	
29	10	19	00	46	
26	05	15	00	42	
18	03	11	00	37	
00	00	10	00	37	
00	00	10	00	37	

APPENDIX IIIa.

Duration of closure of Orthographic single and double voiceless stops.

A kymographic study of words in isolation.

Relevant to Chapter V
(see 5.1 to 5.12)

(pages 624 - 629)

Duration of the stop element in orthographic double and single BILABIAL stops

Table E:- (Three or six samples of the same word were tested in each case).

Orthographic double -pp- preceded by a short vowel in DISYLLABIC words		Orthographic double -pp- preceded by a long vowel in DISYLLABIC words		Orthographic double -pp- preceded by a long or short vowel in TRISYLLABIC or POLY-SYLLABIC words.		Orthographic double -pp- which is one of two abutting consonants in speech.		Word-initial orthographic single p- in connected speech.		Orthographic single -p- in words in which [ɾ] and [p] occur as abutting consonants. Not all these words occur in colloquial speech.	
word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.
tappu [t̪ʻap:ɨ] (fault)	155,165 175,190, 180,180.	pi:ppa:j [pʻi:pʻa:] (barrel)	110,110, 110	paʈippu [pʻaʈipʻɨ] (education)	110,105, 110,115, 120,120.	ti:ɾppu [tʻi:ɾpɨ] (judgement)	140,150, 130.	atu oru	60, 70, 90,105, 80, 85	karpu [kʻarpɨ] (chastity)	180,170, 185,200, 230,220.
								paːṯṯiram [aðɨ woɾo pʻaːṯɾʌ̃]			
appa: [ap:a:] (father)	190,200, 180,180, 180,200	mo:ppam [mo:pʻʌ̃] (sense of smell a dog has)	120,115, 115.	neɾuppu [nɛɾipʻi] (fire)	100,110, 100,115, 120,125.	appuram [apɾʌ̃] (later on)	130,135, 140.	(it is a vessel)		tʃorpo:ɾ [ɕorpo:ɾ] (debate)	205,190 185.
kappal [kʻap:al] (ship)	165,165, 160,155, 175,175	e:ppam [ə:pʻʌ̃] (belch-n.)	110, 130 130.	tʃ eɾuppu [ɕɛɾipʻi] (sandals)	110,115, 120,115, 125,130	uppuma [ʊpma:] (a savoury made of semolina)	140,150, 155,140, 160,150.				
kuppai [kʻop:ɛ] (rubbish)	160,190, 195	ka:ppi [kʻa:pʻɪ] (coffee)	100,105, 110.	paɾuppu [pʻarɨpʻɨ] (lentils)	115,115, 105,125, 115,115.	appaḷam [apḷa:] (a crisp savoury)	130,125, 130.	itu pe:tʃa:ṯu	75, 80, 65, 90, 100,110.	arpan [aɾpan] (petty-minded person)	115,110 115.
								[ɪðɨ pʻe:ɕa:ðɨ] (this will not talk)			
kappam [kʻap:ʌ̃] (tribute money)	160,165, 165.	ṯa:ẓppa:ḷ [tʻa:pʻa:] (bolt-n.)	110,105, 120.	karuppu [kʻarɨpʻɨ] (black)	110,125, 115,130, 110,120.	eppaṯi [jɛpʈɪ] (how)	100,100, 110.				
uppu [ʊp:ʊ] (salt)	180,160, 160.	ṯo:ppu [tʻo:pʻʊ] (grove)	110,110, 120.	mannippu [man:ɪpʻɨ] (forgive-ness)	90, 95, 100.	ma:ppiḷḷai [ma:pḷɛ] (son-in-law)	115,110, 115.				
tʃ oppu [ɕop:ʊ] (toy)	150,160 160	pa:ppa: [pʻa:pʻa:] (child)	125,125, 130.			tʃa:ppiṯṯu [ɕa:pʈɨ] (having eaten)	115,115, 110				
						ku:ppiṯṯu [kʻu:pʈɨ] (having called)	90, 90, 80.				

Duration of the stop element in Orthographic single and double DENTAL stops

Table F:- (Three or six samples of the same word tested in each case).

Orthographic double -tt- preceded by a short vowel in DISYLLABIC words.		Orthographic double -tt- preceded by a long vowel in DISYLLABIC words.		Orthographic double -tt- preceded by a short or long vowel in TRISYLLABIC or POLYSYLLABIC words.		Orthographic double -tt- which is one of two abutting consonants in speech.		Word-initial orthographic single t- in connected speech.	
word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.
pattu [p'aṭ:ɨ] (ten)	190,200, 200.	pa:ɾṭṭa:ɾ [p'a:ṭ'a:ɾ] (he-honorific-saw)	115,115, 120.	kaṭṭa:ʐai [k'aṭ'a:ʐɛ] (cactus)	125,130, 135.	ɾaṭṭinam [raṭnÃ] (ruby)	90,110, 100.	aṭu ṭakka:ɭi [aðɨ ṭ'ak a:ɭɪ] (It's a tomato)	60, 65, 60, 80, 90,100.
aṭṭai [aṭ:ɛ] (aunt)	190,220, 220.	ta:tta: [ṭ'a:ṭ'a:] (grandfather)	110,115, 110.	kaʐuttu [k'aʐɨṭ'ɨ] (neck)	115,115, 125.	a:spaṭṭiɾi [a:spaṭɾɪ] (hospital)	95, 85, 100.		
katti [k'aṭ:ɪ] (knife)	190,210, 220,200, 195,205.	ka:ttu [k'a:ṭ'ɨ] (having waited)	120,105, 110,110, 115,110	ma:ṭṭiɾai [ma:ṭ'əɾɛ] (tablet)	100,105, 100.	pa:ttiɾam [p'a:tɾÃ] (vessel)	125,120, 120, 85, 85, 80.	oɾu ṭakaɾam [woɾɷ ṭ'aɦəɾÃ] (a tin)	65, 75, 95,110, 100,120.
kottu [k'ot:ɷ] (dig-imp.)	200,210, 205.	po:ɾttu [p'o:t'ɷ] (cover with a blanket-imp)	110,115, 120.	poɾuttam [p'oɾɷṭ'Ã] (suitability)	110,100, 100,115, 105,105.	ɾa:ttiɾi [ra:tɾɪ] (night)	120,130, 120,110, 120,120.		
kattu [k'aṭ:ɨ] (shout-imp.)	175,195, 200,190, 200,185.	pa:ṭṭi [p'a:ṭ'ɪ] (flower-bed)	100,105, 100,105, 100,100	ʧiṭṭiɾai [ɾɪṭ'əɾɛ] (name of a month)	110,110, 115,105, 110,110.	aɾttam [aɾṭÃ] (meaning)	125,130, 120,125, 130,130.		
mattu [maṭ:ɨ] (churning ladle)	180,170, 170.	pu:ttu [p'u:ṭ'ɷ] (having blossomed)	110,100, 105.	vipattu [ʋɪβaṭ'ɨ] (accident)	115,115, 120.				
pottu [p'oṭ:ɷ] (cover-imp.)	165,180, 170.	ku:ttu [k'u:ṭ'ɷ] (a wild type of dancing)	110,105, 110,115, 100,105.	a:pattu [a:βaṭ'ɨ] (danger)	110,110, 110.				
kuttu [k'ɷṭ:ɷ] (box-imp.)	180,190, 210,205, 195,200.	va:ttu [ʋa:ṭ'ɨ] (duck)	115,100, 110,110, 105,100.						

Duration of the stop element in orthographic single and double RETROFLEX stops.

(Three or six samples of the same word tested in each case)

Table G:-

Orthographic double -ṭṭ- preceded by a short vowel in DISYLLABIC words.		Orthographic double -ṭṭ- preceded by a long vowel in DISYLLABIC words.		Orthographic double -ṭṭ- preceded by a long or short vowel in TRISYLLABIC or POLYSYLLABIC words.		Orthographic double -ṭṭ- which is one of two abutting consonants in speech.		Orthographic single word-initial ṭ- in connected speech.	
word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.
peṭṭi [pʻoṭːɪ] (box)	180,210, 190,180, 170,180.	paːṭṭi [pʻaːṭʻɪ] (grandmother)	120,130, 130.	paṭṭaːlam [pʻaṭʻaːlÃ] (army)	120,115, 110,110, 110,115.	ʧaṭṭini [ʧaṭɳɪ] (chutney)	100,100, 100,110, 120,110.	oru ṭeːpiḷ [woro ṭeːbḷ] (a table)	70, 75, 80,100, 110,120.
muṭṭai [moṭːɛ] (egg)	190,210, 180.	muːṭṭai [muːṭʻɛ] (bundle)	130,120, 120,120, 120,120.	kaṭṭaːjam [kʻaṭʻaːjÃ] (certainly)	105,105, 110.	paṭṭini [pʻaṭɳɪ] (starvation)	120,110, 115.		
								avaḷ oru	75, 80,
ṭaṭṭu [ṭʻaṭːɨ] (plate)	160,170, 170.	kuːṭṭu [kʻuːṭʻo] (add-imp.)	100,100, 100,105, 100,110.	eṭṭaɳaː [əṭʻaɳaː] (eight annas)	115,110, 120,115, 115,110.	koṭṭukireːn [kʻotrɛ̃] (I'm throwing)	130,130, 130,130, 125,120.	ṭiːʧʧar [avə woro ṭiːṭʻʃər] (she's a teacher)	70,100, 105,120.
kaṭṭi [kʻaṭːɪ] (boil-n.)	190,170, 180.	koːṭṭu [kʻoːṭʻo] (coat)	100,105, 105.	peṭṭijil [pʻoṭʻiːlɛ] (in the box)	110,115, 110.	pitṭaḷai [pʻɪṭḷɛ] (a type of curry)	130,135, 130,130, 125,130.		
koṭṭu [kʻoṭːo] (throw-imp.)	160,170, 170,180, 175,185.	koːṭṭai [koːṭʻɛ] (castle)	120,120, 100,105, 115,100.	ɲaːṭṭijam [naːṭʻɪjÃ] (dance-n.)	120,120, 125.	ʧaːppiṭṭu [ɸaːpṭɨ] (having eaten)	85, 95, 100.		
koṭṭai [kʻoṭːɛ] (seed)	180,190, 180.	ṭiːṭṭu [ṭʻɨːṭʻɨ] (sharpen-imp.)	110,110, 100,110, 100,100.			kuːppiṭṭu [kʻuːpṭɨ] (having called)	80, 90, 90, 90, 85, 80.		
ṭiṭṭu [ṭʻɨṭːɨ] (scold-imp.)	160,165, 160,170, 175,165.	paːṭṭu [pʻaːṭʻɨ] (song)	130,130, 120.						
paṭṭu [pʻaṭːɨ] (silk)	170,175, 175.	aːṭṭai [aːṭʻɛ] (goat-acc.)	130,130, 130,120, 120,110.						
aṭṭai [aṭːɛ] (cardboard)	170,180, 180,190, 185,175.								

Duration of the stop element in Orthographic single and double VELAR stops.

Table H:- (Three or six samples of the same word tested in each case).

Orthographic double -kk- preceded by a short vowel in DISYLLABIC words.		Orthographic double -kk- preceded by a long vowel in DISYLLABIC words.		Orthographic double -kk- preceded by a short or long vowel in TRI-SYLLABIC or POLYSYLLABIC words.		Orthographic double -kk- which is one of two abutting consonants in speech.		Word-initial orthographic single k- in connected speech and medial orthographic single -k-		Orthographic single -k- in words in which [ɾ] and [k] occur as abutting consonants. (Not all these words occur in colloquial speech).	
word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.
pakkam [pʻak:ɐ̃] (side)	190,200 200,195 205,190	pa:kku [pʻa:kʻɨ] (arecanut)	115,110 120,110 110,120	mukka:li [mokʻa:lɪ] (a three-legged stool)	140,140 140.	akkiɾamam [akɾəmɐ̃] (unjust)	130,130 130,140 130,130	itu katti [ɪðɨ kʻaṭ:ɪ] (this is a knife)	65, 60 70,100 110, 85	paɾkaḷ [pʻaɾkaḷ] (teeth)	200,190, 200.
akka: [ak:a:] (elder sister)	190,205, 210.	ʧa:kka: [ɸa:kʻa:] (Is it a gunnybag?)	120,125 120,115 115,110	ʧaɾkkaɾai [ɸakʻəɛ] (sugar)	125,120 110.	ʧakkaɾam [ʧakɾɐ̃] (wheel)	145,135 140,130 130,130	aṭu kampi [aðɨ kʻambɪ] (that is a wire)	65, 60 90,110 100, 95	kaɾkaḷ [kʻaɾkaḷ] (stones)	180,180 200.
ṭukkam [ɖok:ɐ̃] (sorrow)	210,210 200,195 200,205	tu:kkam [ṭʻu:kʻʌ] (sleep-n.)	120,130 130.	ṭakka:ḷi [ṭʻakʻa:lɪ] (tomato)	120,120 130,115 115,120	ʧa:kkale:ṭ [ʧa:klɛṭʻɨ] (chocolate)	105,100 100.	ṭakḷi [ṭʻakḷɪ] (spindle)	165,165 160.	ʧoɾkaḷ [ɸoɾkaḷ] (words)	200,190 190.
makku [mak:ɨ] (foolish person)	190,200 185.	ɲa:kku [na:kʻɨ] (tongue)	125,125 125,120 120,120	iɾukkum [ɪɾɨkʻɯ̃] (It will be)	130,135 130,125 125,130	kuṭaɾkkam [kʻðaɾkɐ̃] (misleading argument)	95, 90 90, 95 100,100	ɾikṣa: [rɪkṣa:] (rickshaw)	100,120 120.		
ṭokku [ṭʻok:o] (a kind of pickle)	200,185 185,190 195,195	mu:kku [mu:kʻo] (nose)	125,125 120.	paɲakka:ɾan [pʻaɲəkʻa:ɾɐ̃] (rich man)	105,110 110.	ṭaɾkkam [ṭʻaɾkɐ̃] (argument)	120,110 105,105 110,110				
ɲakku [nak:ɨ] (lick-imp.)	185,180 180,175 175,190	ṭu:kku [ṭʻu:kʻo] (lift-imp.)	115,115 120,120 115,115	kaɲakku [kʻaɲəkʻɨ] (account)	120,120 120,115 115,120						
				karukkal [kʻaɾɨkʻal] (clouds)	110,120 120,110 105,105						
				peɾukkal [pʻɛɾɨkʻal] (multiplication)	120,105 115.						

Duration of the stop element in Orthographic single and double VELAR stops. (cont)

(Three or six samples of the same word tested in each case).

Table H:-

Orthographic double -kk- preceded by a short vowel in DISYLLABIC words.		Orthographic double -kk- preceded by a long vowel in DISYLLABIC words.		Orthographic double -kk- preceded by a short or long vowel in TRI-SYLLABIC or POLYSYLLABIC words.		Orthographic double -kk- which is one of two abutting consonants in speech.		Word-initial orthographic single k- in connected speech and medial orthographic single -k-		Orthographic single -k- in words in which [ɾ] and [k] occur as abutting consonants. (Not all these words occur in colloquial speech).	
word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.	word	duration of stop m.secs.
				azukku [azɨkˑɨ] (dirt)	100,105 110,100 110,100						
				pu:kka:ɾi [pʻu:kˑaːɾɪ] (flower-girl)	110, 90 90.						
				po:kkiɾi [pʻoːkˑɪɾɪ] (rogue)	110,110 115,110 105,105						
				pa:ɾkkire:n [pʻaːkˑəɾɛ̃] (I shall see)	110,115 105.						
				iɾukkiratu [ɪɾɨkˑɨ] (It is)	135,130 130.						

APPENDIX IIIb

Duration of closure of Orthographic single and double voiceless stops.

A kymographic and spectrographic study of connected speech.

Relevant to Chapter V.
(see 5.13 to 5.19)

(pages 630-643)

Table I

Duration of the stop element in Orthographic double and single stops measured from kymograms of sentences in connected speech.

Note:-

(i) Each sentence was said twice.

(ii) The duration of the stop element is marked in m.secs. under each stop symbol in the phonetic transcription.

(iii) The words forming the sentence are given first in orthography, then the sentence is given in orthography to indicate orthographic doubling, if any, of word-initial stop consonants when the preceding word ends in a vowel.

1) tʃa:ppa:ʈu muʈiṯṯu viṯṯu va:

tʃa:ppa:ʈu muʈiṯṯu viṯṯu va:

[ɸa:p·a:ɽɨ moɽɪt͡·ʃu:ʈ·o ʋa:]
80 60
90 50

(Eat your meal and come).

2) na:n paṯṯu paṭam pa:ṛṯṯe:n

na:n paṯṯuppaṭam pa:ṛṯṯe:n

[nã: p'aṯ:ɨ p'aɽamba:ṯ'ɛ̃]
55 110 30 70
45 110 30 70

(I saw ten movies)

3) oru paṯṯu tʃaṯṯai koṭuṯṯe:n

oru paṯṯutʃ tʃaṯṯai koṭuṯṯe:n

[woɾo p'aṭ'ɨt'ʃaṭ'ɛβɷɽoṯ'ɛ̃]
85 115 100 70
80 120 90 85

(I gave (someone) a silk shirt)

4) pa:ṯṯijai paṯṯijil pa:ṛṯṯe:n

pa:ṯṯijaippaṯṯijil pa:ṛṯṯe:n

[p'a:ṭ'ɤjɛp'aṭ'i:lɛβa:ṯ:ɛ̃]
110 140 110 95
110 120 115 90

(I saw grandmother in the cow-shed)

5) kaṯavai ṯa:ẓppa:l po:ṭu

kaṯavaiṯṯa:ẓppa:l po:ṭu

[k'aðaʷɛṯ'a:p'a:p'o:ɽo]
90 65 60
95 70 70

(Bolt the door)

6) patʃai ka:jtʃtʃi oʈʈukire:n

patʃai ka:jtʃtʃi oʈʈukire:n

[p'aɕɛɲa:t'ʃɪ wot̪ɾɛ̃]
110
100

(I have made some glue and I am pasting (something))

7) peʈʈi paʈukkai ella:m kaʈʈukire:n

peʈʈi paʈukkaijella:m kaʈʈukire:n

[p'oʈ'ɪβaɽɨk'ɛjɛl:ã: k'at̪ɾɛ̃]
110 60 80 130
115 60 100 140

(I am packing (my) luggage).

8) to:ʈʈattukku taŋŋi:ɾ pa:jtʃtʃa ve:ŋʈum

t̪o:ʈʈat̪t̪ukkut̪t̪aŋŋi:ɾ pa:jtʃtʃa ve:ŋʈum

[t̪'o:ʈ'at̪'ɨk'ɨ t'aŋ:ɪβa:t'ʃəŋÃ]
90 70 80 100
85 75 80 105

(I must water (the plants in the) garden).

9) avanukku pe:tʃtʃu mu:tʃtʃ u illai

avanukkup pe:tʃtʃu mu:tʃtʃillai

[aʊɨnɨk'ɨp'e:t'ʃɨ mu:t'ʃɪl:ɛ]
70 115
85 110

(He is unconscious)

10) t̪e:kku maɾama: pa:kku maɾama:

t̪e:kku maɾama: pa:kku maɾama:

[t̪ʻe:kʻɨmaɾəma: pʻa:kʻɨ maɾəma:]
115 120 100
90 120 95

(Is it teak or arecanut?)

11) pa:ṯṯiɾaṯṯil patʃ tʃai pajaru illai

paṯṯiɾaṯṯil patʃ tʃaip pajaru illai

[pʻa:ṯɾəṯʻɨlɛ pʻatʻʃɛpʻajəɾɨ ɪl:ɛ]
85 75 65 80
65 60 50 75

(There are no greengrams in the vessel)

12) t̪o:ppil oɾuvaɾum illai ; akkiɾamam

t̪o:ppil oɾuvaɾumillai ; akkiɾamam

[t̪ʻo:pʻɑlɛ wot̪ɾɑmɪl:ɛ akɾəmÃ]
105 165 130
70 150 120

(There is no one in the grove; it is unfair).

13) t̪a:ɻppa:l po:ṭṭu viṭṭu va:

t̪a:ɻppa:l po:ṭṭu viṭṭu va:

[t̪ʻa:pʻa:pʻo:ʈʻu:ʈʻɑ ʋa:]
70 60 65 50
65 70 65 50

(Bolt the door and come)

14) tʃa:kku n̪iraija e:lakka:j iɾukkiraṯu

tʃa:kku n̪iraija e:lakka:j iɾukkiraṯu

[ʧa:k•i nəɾəjə je:lak•a: ɪɾik•i]
100 105 70
95 90 65

(The gunnybag is full of cardamoms).

15) appuram pa:ɾkkala:m

appuram pa:ɾkkala:m

[apɾəmba:k•əlã:]
100 55
90 55

(Let us see later).

16) pot̪t̪alam kat̪t̪a ve:ɳt̪um

pot̪t̪alam kat̪t̪a ve:ɳt̪um

[p'ot̪ləŋgat̪•ənm̃]
90 50
100 55

(I must make packets (of something)).

17) oɾu appaḷam po:ṯu

oɾu appaḷam po:ṯu

[woɾo apḷa:mbo:ɽo]
100
100

(Give me an appalam)

18) iṯil uppe: illai

iṯil uppe: illai

[ɪðɨlɛ ɷp:e: ɪl:ɛ]
180
200

(There is absolutely no salt in this)

19) iŋke: ka:rre: vaɾa:ṯu

iŋke: ka:rre: vaɾa:ṯu

[ɪŋgɛ k'a:ṯ:e: ʋaɾa:ðɨ]
95 160
90 150

(You'll get absolutely no breeze here).

20) pa:ɾṯṯu po: enru paṯṯu ṯaɾam tʃonne:n

pa:ɾṯṯup po:venru paṯṯuṯ ṯaɾam tʃonne:n

[p'a:ṯ'ɨp'o:n:ɨ p'aṯ'ɨṯ'aɾəndʒon:ɛ̃]
115 130 80 130 45
110 135 85 115 40

(I told him ten times to be careful while going).

21) itil uppu iɾukkiraṯa: pa:ɾ

iṯil uppiɾukkiraṯa: pa:ɾ

[ɪðɨlɛ ɷp'ɨɾɨk'a:βa:ɾɨ]
125 50
125 60

(See if there is any salt in this)

22) paṯṯum muppaṯum naːrpaṯu

paṯṯum muppaṯum naːrpaṯu

[pʻaṯːṹ moppʻəðṹ naːpʻəðɨ]

150 110 105
140 115 100

(Ten and thirty make forty).

23) inraikku oɾu peːtʃtʃu poːʈʈi

inraikku oɾu peːtʃtʃup poːʈʈi

[ɪnːɪkʻɪ woɾɷ pʻeːtʻʃɨpʻoːʈʻɪ]

50 60 60 60
65 70 65 65

(There is an oratorical contest to-day).

24) viːʈʈil paːkkeː illai

viːʈʈil paːkkeː illai

[ʋɨːʈlɛ pʻaːkːeː ɪlːɛ]

60 105 145
60 115 130

(There are absolutely no arecanuts at home).

25) aṯṯai aːspaṯṯiɾijil iɾukkiraːl

aṯṯai aːspaṯṯiɾijil iɾukkiraːl

[aṯːɛ aːspaṯɾiːlɛɾkaː]

140 65 50 50
135 60 50 60

(Aunt is in hospital)

26) muṭṭijil kaṭṭi vantu iɾukkiraṭu

muṭṭijil kaṭṭi vantu iɾukkiraṭu

[moṭ'i:lɛ k'aṭ:ɪ vandɾki]

135 60 110 50
140 60 115 40

(There is a boil on (my) knee).

27) pakkattu kaṭaijil ʧa:kke: illai

pakkattuk kaṭaijil ʧa:kke: illai

[p'ak•aṭ•ik•aɽe:lɛ ɕa:k:e: ɪl:ɛ]

95 60 60 110
85 60 65 110

(There are absolutely no gunnybags in the next shop)

28) pa:karka:j patʃtʃaija:ka iɾukkiraṭu

pa:karka:j patʃtʃaija:ka iɾukkiraṭu

[p'a:ɾik•a: p'at:ʃɛja:ɾki]

100 75 40
90 80 45

(The bitter-gourd is very green).

Weeks after these kymograms were made, the same 28 sentences were tape-recorded in the present writer's pronunciation and spectrograms were made. The duration of the stop element of the voiceless stops were measured again, this time from spectrograms. Table J on the next few pages contains this spectrographic analysis. Each sentence was said once for purposes of this analysis. The sentences in the following Table are given in phonetic transcription only. Detailed summary and tabulated results of the kymographic and spectrographic analysis of connected speech are given in Chapter V (see page 258).

Table J

Duration of the stop element of Orthographic single and double voiceless stops measured from spectrograms of the same sentences as the ones used in the kymographic analysis.

Note:-

(i) The sentences are in phonetic transcription.

(ii) The duration of the stop element (in m.secs.) is marked under each voiceless stop symbol in the transcription.

1) [ɸa:p•a:ɾi mɔɾ t•ʃu:ʈ•ɔ ʋa:]
80 76

2) [nã: p'at:ɨ p'aɾamba:t•ɛ̃]
66 120 66 66

3) [woɾɔ p'aʈ•ɨt•ʃaʈ•ɛɦɔɾɔt•ɛ̃]
80 86 60 76

4) [p'a:ʈ•ɪ ɟɛp•aʈ•i:lɛβa:t•ɛ̃]
94 120 100 70

5) [k'aðaʋɛt•a:p•a:p•o:ɾɔ]
80 62 60

6) [pʻaɕɛɦaːtʻʃɪ wotɾɛ̃]
100

7) [pʻotʻɪβaɽɨkʻɛjɛlːaː kʻatɾɛ̃]
118 46 50 90

8) [t̪ʻoːtʻatʻɨkʻɨ t̪ʻaɳːɪβaːtʻʃəɳÃ]
80 72 72 98

9) [avɨnɨkʻɨpʻeːtʻʃɨmuːtʻʃɪlːɛ]
78 136

10) [tʻeːkʻɨmaɾəmaː pʻaːkʻɨmaɾəmaː]
90 80 80

11) [pʻaːt̪ɾət̪ʻɨlɛ pʻatʻʃɛpʻajaɾɨ ɪlːɛ]
102 80 80 96

12) [t̪ʻoːpʻɑlɛ wot̪ɾɔmɪlːɛ akɾəmÃ]
98 122 102

13) [t̪ʻaːpʻaːpʻoːtʻuːtʻɑ ʋaː]
58 62 72 60

14) [ɕaːkʻɨ nəɾəjə jeːlakʻaː ɪɾɨkʻɨ]
92 78 78

15) [apɾəmba:kˈəlɑ̃:]
98 46

16) [pʻotɭəŋgatˈəɳɯ̃]
98 72

17) [woɾɷ apɭa:mbo:ɽɷ]
80

18) [ɪðɨlɛ ɷp:e: ɪl:ɛ]
164

19) [ɪŋgɛ kʻa:t̪:e: ʋaɾa:ðɨ]
76 204

20) [pʻa:t̪ˈɨpˈo:n:ɨ pʻat̪ˈɨt̪ˈaɾəndʒon:ɛ̃]
112 140 112 150 82

21) [ɪðɨlɛ ɷpˈɾɨkˈa:βa:ɾɨ]
136 56

22) [pʻat̪:ɯ̃ mɷpˈəðɯ̃ na:pˈəðɨ]
160 140 106

23) [ɪn:ɪkˈɪ woɾɷ pʻe:tˈʃɨpˈo:ʈˈɪ]
56 82 78 80

24) [ʋɨ:ʈɭɛ p'a:k:e: ɾl:ɛ]
62 94 144

25) [aʈ:ɛ a:spaʈɾi:lɛɾka:]
130 76 64 50

26) [moʈ'i:lɛ k'aʈ:ɪ ʋandɾkɨ]
136 64 98 60

27) [p'a:k'aʈ'ɨk'aɽe:lɛ ɕa:k:e: ɾl:ɛ]
80 80 72 116

28) [p'a:ɾɨk'a: p'aʈ:ʃɛja:ɾkɨ]
60 96 50

APPENDIX IVa

Aspiration of Voiceless stops - a kymographic study of words in isolation.

(relevant to Chapter VI)

(pages 644-650)

Table K:- **Aspiration of the voiceless bilabial stop [p]**

Initial [p] followed by a short vowel		Initial [p] followed by a long vowel		Medial [p]		Intervocalic [p·] or [p:] (orthographic -pp-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each
[poʈ:ɪ] (box)	10,10,10, 15,10,20	[pa:ʈ·ɪ](grandmother)	13, 8, 8, 13,13,13.	[apɾÃ] (later)	0, 0, 0.	[t̪ap:ɨ] (fault)	0, 0, 0, 3, 0, 0.
[paɭ:ɨ] (tooth)	15,15,23, 15,20,20.	[po:ʈ·ɷ] (having put)	20,25,23.	[apɭã:] (pappadam)	8, 5, 5.	[kap:al] (ship)	0, 0, 0, 0, 0, 0.
[pak:Ã] (side)	10,13,10.	[pa:t̪·ɪ] (flower-bed)	10, 8,10.	[ma:pɭɛ] (bridegroom)	5, 5, 5.	[kap:Ã](tribute money)	0, 0, 0.
[poʈ:ɷ] (caste-mark)	15,13,20.	[pa:k·ɨ] (areca nut)	15,15,20.	[ɷpma:](a savoury made of semolina)	0, 0, 0, 0, 0, 0.	[ɸop:ɷ] (toy)	8, 8, 8.
[paʈ:ɨ] (silk)	10,10,10.	[pa:lÃ] (bridge)	13,10,13, 15,10,13.	[jɛpɽɪ] (how)	0, 0, 0.	[ɷp:ɷ] (salt)	10,10,10.
[pɪʈɭɛ](a type of curry)	13,15,15.			[t̪i:ɾpɨ](judgement)	5, 5, 5.	[kɷp:ɛ] (rubbish)	0, 5, 0.
[paɭ:ɪ] (lizard)	5, 0, 5, 10,15,10.	[pu:k·a:ɾɪ](flower-girl)	35,30,30.	[a:spat̪ɾɪ] (hospital)	0, 0, 0.	[paɽɪp·ɨ] (studies)	5,10, 5, 0, 5, 5.
[pat̪:ʃɛ] (green)	13,20,20.	[po:k·ɪɾɪ] (rogue)	25,30,30.	[alpÃ](petty-minded person)	0, 0, 5.	[nɛɾɨp·ɨ] (fire)	5, 5, 5, 0, 5, 0.
[poɳ:ɷ] (girl)	25,20,25.	[pa:t̪·ʃɛ] (an insect)	10,15,15.			[ɸɛɾɨp·ɨ](sandals)	0, 0, 0, 5, 5, 5.
[pɷɳ:ɷ] (wound-n.)	10,13,13.	[pa:k·ərɛ̃] (I shall see)	15,15,20.	[kaɾpɨ] (chastity)	10,10,10.	[paɾɨp·ɨ] (lentils)	5, 5, 5, 0, 5, 0.
[pand̪ɨ] (ball)	15,25.	[po:t̪·ʃɷ] (It's gone)	30,30,23.			[kaɾɨp·ɨ] (black)	5, 5, 5, 0, 5, 0.
[pand̪ʒɨ] (cotton)	13,25.	[pe:t̪·ʃɨ] (speech)	13,13,13.			[ka:p·ɪ] (coffee)	0, 0, 0.
[poṯnɨ](with a thud)	10, 8,10.	[pu:ɳdɷ] (garlic)	25,25,15, 15,20,15.			[ta:p·a:] (bolt-n.)	5, 0. 5.
[paʈɳɪ] (fasting)	10,15.	[po:ŋgo:](you-honorific-go)	18,18,25.			[t̪o:p·ɷ] (grove)	8, 8,10.
[pɷɭɪ] (tamarind)	15,15,25, 30,30,25.	[pa:ɾu:] (Paroo! -voc)	10,10,8.			[mo:p·Ã](sense of smell a dog has)	10,10,10.
[pɷɭ:ɪ] (dot)	20,20,20.	[pi:p·a:] (barrel)	10,10,10.			[pi:p·a:] (barrel)	0, 0, 0.
[pan:ɪ] (pig)	30,25,30.	[pa:t̪·a:ɾ](he-honorific-saw)	8, 8,10.			[kə:p·əɾ](he-honorific-will ask)	0, 0, 5.
[panɪ] (dew)	20,25,20.	[pa:ʈ·i:](granny! -voc.)	5, 5,10.			[ə:p·Ã](belching-n.)	0, 0, 0.
[pɷlɪ] (tiger)	25,20,30.	[pa:ɾɨ] (see - imp.)	5,10,13, 5, 5,10.			[ap:a:] (father)	0, 0, 0.
[pɷɳ] (wound-n.)	18,13,13.						
[pe:n] (louse)	10,15,15.	[pa:t̪ɾÃ] (vessel)	20,15,15.				
[pat̪:ɨ](ten)	25,15,15.	[pa:ɽÃ] (lesson)	5, 5,10.				
[paɽÃ] (picture)	5,10,10, 13,10,15.	[pa:ɦɨ] (caramel)	5, 5, 5.				
[poðɷ] (common)	20,30,23.						

Table K:- Aspiration of the voiceless bilabial stop [p] (cont).

Initial [p] followed by a short vowel		Initial [p] followed by a long vowel		Medial [p]		Intervocalic [p·] or [p:] (orthographic -pp-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each
[poʈ·i:lɛ](in the box)	15,13,13.						
[paʈ·a:lÃ] (army)	10,10,10.						
[porɑ̰ʈ·Ã] (likeness)	15,15,25.						
[paðÃ] (word)	13,10,10, 13,10,13.						
[pɑ̰stəɦÃ] (book)	15,18,15.						
[paɳək·a:ɾÃ] (rich man)	10,15,10.						
[pɛɾɨk·al] (multiplication)	13,10,10.						
[paɽɪp·ɨ] (studies)	5, 5,10, 5, 5, 5.						
[paɾɨp·ɨ] (lentils)	5, 5, 5, 5, 3, 5.						

Table L:- Aspiration of the voiceless dental stop [t̪]

Initial [t̪] followed by a short vowel		Initial [t̪] followed by a long vowel		Medial [t̪]		Intervocalic [t·] or [t̪:] (orthographic -tt-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each
[t̪at:ɨ] (plate)	10,13, 8.	[t̪a:p·a:](bolt-n.)	5, 10,10.	[a:spat̪ɾɪ](hospital)	0, 0, 0.	[kat̪:ɨ](shout-imp.)	10,10,5.
[t̪ap:ɨ] (fault)	8, 8,10, 5,10, 5.	[t̪o:p·o] (grove)	8, 13, 8.	[rat̪nʌ̃] (ruby)	5, 8, 8.	[pot̪:o](cover the eyes)	0, 0,0.
[t̪aŋgɛ](younger sister)	10, 8, 5.	[t̪ɨ:t̪·ɨ](sharpen-imp.)	20,18,15, 25,20,15.	[ra:t̪ɾɪ] (night)	5, 0, 0, 5, 5, 0.	[kot̪:o](punch-imp.)	0, 0,0.
[t̪akɭɪ] (spindle)	15,13,13.	[t̪o:t̪·ʃo](having washed the clothes)	15,10,15.			[pat̪:ɨ] (ten)	0, 0,0.
[t̪at:ʃʌ̃] (carpenter)	10,10,13.			[pa:t̪ɾʌ̃] (vessel)	5, 3, 5.	[at̪:ɛ] (aunt)	0, 0,0.
[t̪ɨn:ɨ] (eat - imp.)	18,13,10.	[t̪e:t̪·ʃɨ](having washed the utensils)	13,15,15.	[aɾt̪ʌ̃] (meaning)	10,5, 5.	[kat̪:ɪ] (knife)	0, 0,0.
[t̪ambɪ](younger brother)	5, 5, 5, 10,10,10.	[t̪ə:ɭɨ] (scorpion)	13, 8, 8.	[pɔst̪əɲʌ̃] (book)	5, 5, 5.	[kot̪:o] (dig-imp.)	0, 0,0.
[t̪ɨt̪:ɨ] (scold - imp.)	8,10, 8.	[t̪e:ngu:ɽo](beehive)	8, 8,10.	[pot̪nɨ] (with a thud)	5, 5, 5.	[a:βat̪·ɨ] (danger)	5, 5,5.
[t̪ot̪:o](having touched)	10,10,10.	[t̪ə:ɭ] (scorpion)	15,15,20.			[ʋɪβat̪·ɨ] (accident)	0, 0,5.
[t̪oɭɪ] (a drop)	15,13,10	[t̪e:n] (honey)	15,10,13.			[ma:t̪·ɨ] (change-imp.)	5, 5,5, 8,10,10.
		[t̪u:kʰʌ̃] (sleep-n.)	5, 5, 5.			[ka:t̪·ɨ] (wind)	8, 8,5.
		[t̪i:ɾpɨ](judgement)	15,20,23.			[po:t̪·o](cover with a blanket)	8, 5,5.
		[t̪u:ɭɪ] (a cloth cradle)	15,10,15.			[ku:t̪·o](a wild type of dancing)	5, 5,5.
						[pa:t̪·ɪ](flower-bed)	5, 5,5.
						[pa:t̪·a:ɾ](he-honorific-saw)	0, 0,0.
						[kat̪·a:ɻɛ] (cactus)	5, 0,5.
						[kaɻɨt̪·ɨ] (neck)	5, 5,5.
						[ma:t̪·əɾɛ] (pill)	5, 5,5.
						[poɾot̪·ʌ̃] (likeness)	5, 5,5.
						[ɾɪt̪·əɾɛ](name of a month)	0, 0.0

Table M:- **Aspiration of the voiceless retroflex stop [ʈ]**

Initial [ʈ] followed by a short vowel		Initial [ʈ] followed by a long vowel		Medial [ʈ] or [ʈ]		Intervocalic [ʈ·] or [ʈ:] (orthographic -tt-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each
[ʈɪkʰɨʈʰɨ] (ticket)	0, 0, 0.	[ʈi:] (tea)	3, 3, 5.	[koʈɾɛ̃](I am throwing)	0, 0, 3.	[poʈ:ɪ] (box)	0, 0, 0, 0, 0, 0.
[ʈɛjlaɾ] (tailor)	0, 0, 0.	[ʈe:bl] (table)	0, 0, 0, 0, 0, 0.	[pɪʈlɛ](a type of curry)	0, 0, 5, 0, 0, 3.	[ʈaʈ:ɨ] (plate)	0, 0, 0.
[ʈajɑ̃] (time)	0, 0, 0, 0, 0, 0.	[ʈi:tʰʃəɾ] (teacher)	3, 0, 5, 0, 3, 0.	[ʧaʈɳɪ] (chutney)	0, 0, 0.	[kaʈ:ɪ] (boil-n.)	0, 0, 0.
[ʈajaɾ] (tyre)	0, 0, 0, 0, 0, 0.	[ʈi:pʰa:j] (teaboy)	5, 0, 3, 5, 5, 8.	[ku:pʈɨ] (having summoned)	0, 0, 0.	[paʈ:ɨ] (silk)	0, 0, 0.
[ʈɪn:ɨ] (tin)	0, 0, 0.	[ʈa:ɾtʰʃɨ] (torch)	0, 0, 0.	[ɸa:pʈɨ] (having eaten)	0, 0, 0, 0, 0, 0.	[aʈ:ɛ](cardboard)	0, 0, 0.
[ʈɪn] (tin)	5, 5, 5.					[koʈ:ɔ] (throw-imp)	0, 0, 0, 0, 0, 0.
						[ʈɨ:ʈɨ](sharpen-imp)	0, 0, 0.
						[ko:ʈʰɛ] (castle)	5, 5, 5.
						[pa:ʈʰɨ] (song)	0, 0, 3.
						[a:ʈʰɛ] (goat-acc.)	0, 0, 0.
						[əʈ:ɨ] (eight)	0, 0, 0.
						[kɨʈ:ə] (nearby)	0, 0, 0.
						[ku:ʈʰɔ](a type of curry)	0, 0, 0, 0, 0, 0.
						[kə:ʈʰɨ](having asked)	0, 0, 0.
						[mɔʈ:ɛ] (egg)	0, 0, 0.
						[mu:ʈʰɛ] (bundle)	0, 0, 0.
						[gəʈ:ɪ] (strong)	0, 0, 0.
						[paʈʰa:lɑ̃] (army)	0, 0, 0.
						[kaʈʰa:jɑ̃](certainly)	0, 0, 0.
						[əʈ:aɳa:](eight annas)	0, 0, 0.
						[poʈ:i:lɛ](in the box)	0, 0, 0.
						[naːʈʰɪjɑ̃](dance-n.)	5, 0, 0, 3, 0, 0.

Table N:- Aspiration of the voiceless velar stop [k]

Initial [k] followed by a short vowel		Initial [k] followed by a long vowel		Medial [k]		Intervocalic [k·] or [k:] (orthographic -kk-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each
[kaʈ:ɪ] (knife)	5, 5, 8, 10,10,10.	[ka:ɸɨ] (money)	10,10, 8.	[tʃakɾÃ] (wheel)	10,10,10.	[pak:Ã] (side)	5,10, 5.
[kap:al] (ship)	5, 8,10, 0, 5,10.	[ka:lɨ] (leg)	5,10, 5.	[akɾəmÃ] (unjust)	10,10,10, 0, 5, 0.	[ak:a:](elder sister)	13,8, 8.
[kal:ɨ] (stone)	10,10,10, 10,10, 5.	[ka:p·ɪ] (coffee)	0, 0, 0.	[tʃa:klɛʈ·ɨ](chocolate)	0, 0, 0.	[ɠok:Ã] (sorrow)	5, 10,10
[kap:Ã](tribute money)	0, 0, 0.	[ka:ʈ·ɨ] (wind)	0, 0, 0.	[ʋandɾka:] (they've come)	0, 0, 0, 0, 0, 0.	[mok·a:lɪ](a three-legged stool)	0, 0, 0.
[kɑt:o] (punch-imp.)	0, 0, 0.	[ku:ʈ·o](a wild type of dancing)	8, 8,10.			[ɸak·ərɛ] (sugar)	5, 5, 5.
[koʈ:o] (throw-imp.)	5, 5, 8.	[ko:ʈ·ɛ] (castle)	0, 0, 0.	[koɓərkÃ](fallacious argument)	0, 0, 0.	[pa:k·ɨ] (arecanut)	5, 5, 5.
[koʈ:ɛ] (seed)	8, 8, 8.	[ka:ʈ·ʃal] (fever)	0, 5, 5.	[ʈakɭɪ] (spindle)	5, 8, 5.	[pu:k·a:ɾɪ](flower-girl)	0, 0, 0.
[koʈɾɛ̃](I am throwing)	15,15,20.	[kɨ:ɻɛ] (down)	20,15,15.			[po:k·ɪɾɪ] (rogue)	10,10,10.
[koʈ:ʃɛ] (slang)	18,15,15.	[ku:ʈ·o](a type of curry)	8,10,10.			[pa:k·ərɛ̃](I shall see)	5, 5, 5.
[kɨʈ:ə] (nearby)	10,10,10.	[ko:ɻɪ] (hen)	8,10,10.			[ɸa:k·a:](Is it a gunnybag?)	0, 0, 0.
[kop:ɛ] (rubbish)	15,10,10.	[ke:lɪ] (fun)	15,20,15.			[paɳək·a:ɾÃ](rich man)	0, 0, 0.
[kol:o] (kill-imp.)	8,10,10.	[kə:p·ər](he-honorific-will ask)	10,10,10.			[kaɳək·ɨ] (account)	10,10,10.
[kambɪ] (wire)	10,10.	[ku:pʈɨ](having summoned)	15,15,15.			[kaɾɨk·əl] (clouds)	5, 0, 0.
[kandal] (rags)	15,13,15, 15,10,15.	[kə:ʈ·ɨ](having asked)	15,10,15.			[pɛɾɨk·al] (multiplication)	0, 0, 0.
[kəlɛ](branch of a tree)	15,10,10.	[ka:ðɨ] (ear)	0, 0, 0.			[aɻɨk·ɨ] (dirt)	10,10,13.
[kal:ɨ] (stone)	15,10,10.	[ka:ɻɨ] (forest)	0, 5, 0.				
[kan:ɨ] (calf)	20,15,15.	[ko:ʈ·o] (coat; jacket)	0, 0, 0, 5, 5, 5.				
[kanɨ] (a festival)	20,20,20.						
[kaɭ] (toddy)	10, 5,10.						
[kaɳ] (eye)	0, 0.						
[kəʈ:ɨ] (having lost)	5, 5, 5.						
[koʈ:o] (dig)	10,10, 8.						
[kaβəɻɨ] (deceit)	13, 8, 8.						
[kaɾpɨ] (chastity)	0, 0, 0.						
[kaɳək·ɨ] (account)	0, 0, 0.						

Table N:- Aspiration of the voiceless velar stop [k] (cont)

Initial [k] followed by a short vowel		Initial [k] followed by a long vowel		Medial [k]		Intervocalic [k·] or [k:] (orthographic -kk-)	
word used	period of voicelessness after release of stop m.secs. 2/3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each	word used	period of voicelessness after release of stop m.secs. 3/6 samples of each
[kaɾɨkˑəl] (clouds)	5,10,15.						
[kɔðərkÃ] (fallacious argument)	5,10,15.						
[kaɾɨpˑɨ] (black)	0, 0, 0, 0, 0, 0.						
[kaţˑaːzɛ] (cactus)	0, 0, 0.						
[kazɨţˑɨ] (neck)	0, 0, 0.						
[kaţˑaːjÃ] (certainly)	15,15,10.						

APPENDIX IVb

Aspiration of voiceless stops.

A kymographic study of connected speech.

(relevant to chapter VI)

(pages 651 - 657)

Table 0:-

Aspiration of voiceless stops in connected speech.

Note:-

(i) The sentences are given in phonetic transcription.

(ii) The period of voicelessness following the release phase of the stop is given in milliseconds just below the symbol representing the voiceless stop in each case.

(iii) Each sentence was said 2, 3 or 4 times.

1) [aðɨ wɔrɔ pa:t̪ɾ̃ã] (It is a vessel)
15 0
15 0
15 0

2) [ɪðɨ pe:ɕa:ðɨ] (This will not talk)
10
10
10

3) [paɳəŋgɔɽɔ] (Give me some money)
15
15
15

4) [aðɨ t̪ak•a:lᵻ] (That's a tomato)
10 0
10 0
10 0

5) [kaɳd̪ɛɾɪja:ðɨ̞] ((someone) cannot see).
15
10
8

6) [kaɳdʒɪβo:ɽo] (Prepare some gruel)
8
15

7) [kaɳdʒɪɦoɽɪ] (Drink some gruel)
8
8

8) [nɑ̃: paʈ̪ʲɨ̞pʲaɽəmba:ʈ̪ʲɛ̃] (I saw ten movies)
5 8 0 0
5 8 0 5

9) [woɾo paʈʲɨ̞tʲʃaʈʲɛɦoɽot̪ʲɛ̃] (I gave (someone) a silk shirt)
10 0 0 5
10 0 0 0
10 0 0 0
10 0 0 0

10) [pa:ʈ̪ʲɪjɛ paʈʲi:lɛβa:t̪ʲɛ̃] (I saw grandmother in the cowshed)
10 0 5 0 0
13 0 5 0 5

11) [kaðavɛt̪ʲa:pʲa:pʲo:ɽo] (Bolt the door)
0 5 10 10
0 0 10 10

12) [poʈˑɪ βaɽɨkˑɛjɛlːãː kaʈɾɛ̃] (I am packing my
23 5 10 15 0 luggage)
20 0 5 15 0

13) [t̪oːʈˑaʈˑɨkˑɨ t̪aɳːɪβaːt̪ˑʃəɳÃ] (I must water the
5 5 5 0 5 plants in the garden)
13 0 5 0 10

14) [aʊɨnɨkˑɨpˑeːt̪ˑʃɨmuːt̪ˑʃɪlːɛ] (He is unconscious)
5 10
5 5

15) [t̪eːkˑɨmaɾəmaː paːkˑɨmaɾəmaː] (Is it teak or
20 5 10 0 arecanut?)
20 0 5 0

16) [paːtɾət̪ˑɨlɛ pat̪ˑʃɛpˑajəɾɨ ɪlːɛ] (There are no
13 5 10 10 5 greengrams in the
13 5 10 10 10 vessel)

17) [t̪oːpˑɷlɛ wot̪ɾɷmɪlːɛ akɾəmÃ] (There is no one in
18 5 5 0 the grove; it is unjust)
13 10 0 0

18) [t̪aːpˑaːpˑoːʈˑuːʈˑɷ ʋaː] (Bolt the door and come)
10 10 10 0 0
10 5 10 0 0

19) [ɸa:k'ɨ nəɾəjə je:lak'a: ɪɾɨk'ɨ] (The gunnybag is
5 10 10 full of cardamoms).
10 10 10

20) [apɾəmba:k'əlɑ̃:] (Let us see later)
0 0
5 0

21) [woɾɷ apɭa:mbo:ɽɷ] (Give me a pappadam)
10
10

22) [ɪðɨlɛ ɷp:e: ɪl:ɛ] (There is absolutely no salt
15 in this)
10

23) [ɸa:p'a:ɽɨ mɷɽɪt'ʃu:ʈ'ɷ ʋa:] (Eat your meal and
10 0 come)
10 0

24) [paɸɛɱa:t'ʃɪ wotɾɛ̃] (I have made some glue and I
13 0 am pasting something)
13 0

25) [ɪŋgɛ ka:t̪:e: ʋaɾa:ðɨ] (You get absolutely no
0 10 breeze here)
0 10

26) [pa:t̪ʰɨpʰo:n:ɨ paṯʰɨt̪ʰaɾəndʒon:ɛ̃] (I told him ten
13 5 15 10 10 0 times to be careful
10 5 10 10 10 5 while going)

27) [ɪðɨlɛ ɷpʰɨɾɨkʰa:βa:ɾɨ] (See if there is any salt
10 0 in this)
10 0

28) [paṯʰɯ̃ mɷpʰəðɯ̃ na:pʰəðɨ] (Ten and thirty make
15 5 5 0 forty)
20 5 0 0

29) [ɪn:ɪkʰɪ woɾo pe:t̪ʰʃɨpʰo:ʈʰɪ] (There is an
5 10 10 0 oratorical contest
5 10 10 0 to-day)

30) [ʋɨ:ʈlɛ pa:k:e: ɪl:ɛ] (There are absolutely no
0 10 10 arecanuts at home)
0 10 10

31) [aṯ:ɛ a:spaṯɾi:lɛɾka:] (Aunt is in hospital)
5 10 10 0
10 10 10 5

32) [mɷʈʰi:lɛ kaʈ:ɪ ʋandɾkɨ] (There is a boil on
0 5 0 5 my knee)
5 5 0 5

33) [pɑk·ət̪·ɨk·ɑɽe:lɛ ɸa:k:e: ɾl:ɛ](there are absolutely no gunnybags in the shop next door)
13 0 0 5 20
13 5 5 10 20

34) [pa:ɾɨk·a: pat̪:ʃɛja:ɾkɨ] (The bitter-gourd is very green)
13 5 10 10
10 5 10 10

35) [poʈɭəŋgaʈ·ənw̃] (I must make packets (of something))
30 0 0
20 0 5

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